

***United States Court of Appeals
for the Second Circuit***



**APPELLANT'S
BRIEF**

75-7621

75-7645

No. 75-7621

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THE
United States Court of Appeals

FOR THE SECOND CIRCUIT

PLANTRONICS, INC.,

*Plaintiff-Appellant
and Cross-Appellee,*

v.

ROANWELL CORPORATION,

*Defendant-Appellee
and Cross-Appellant.*

APPEAL FROM THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF NEW YORK

BRIEF FOR APPELLANT PLANTRONICS, INC.

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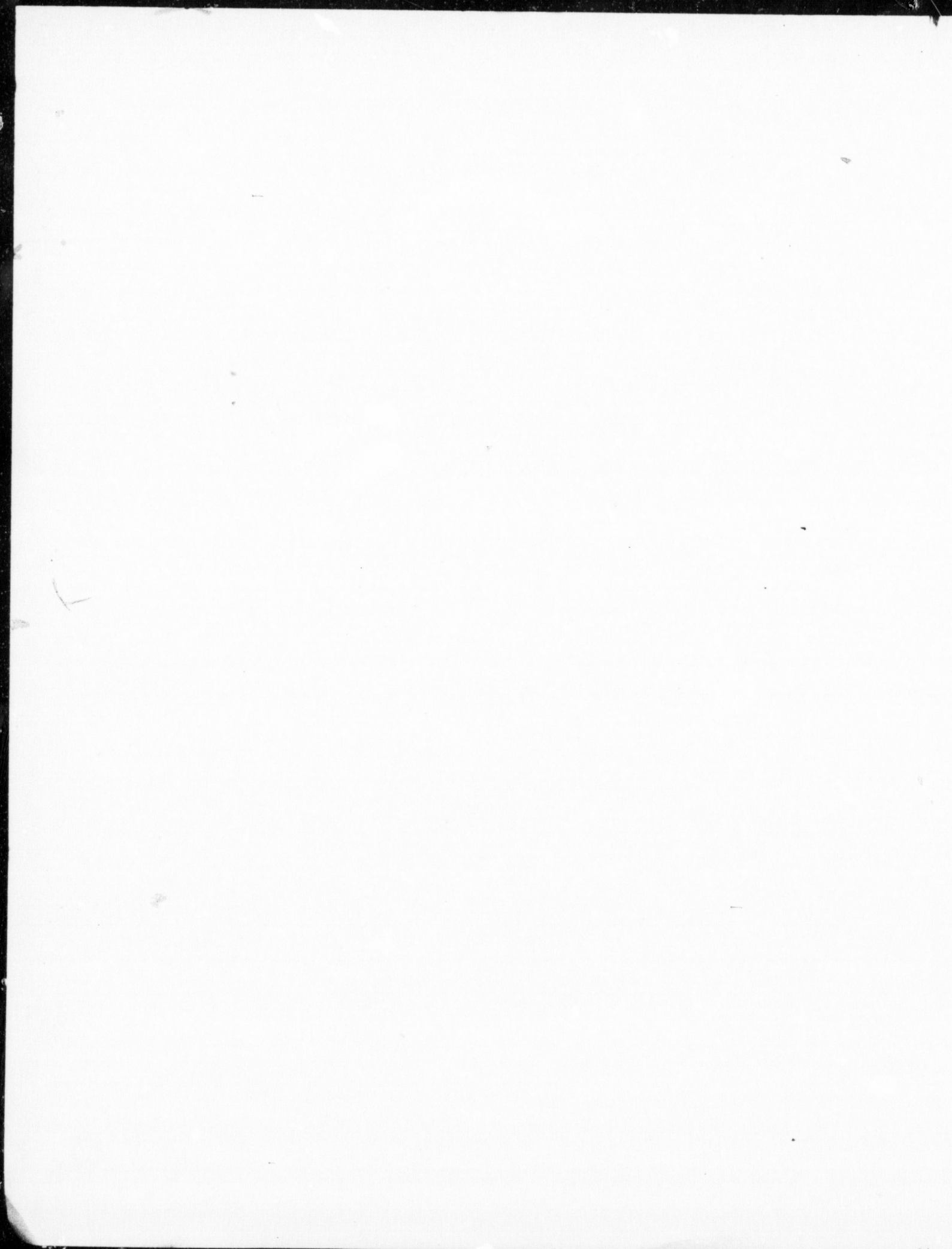


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BRIEF FOR APPELLANT PLANTRONICS, INC.

STATEMENT OF THE ISSUES PRESENTED FOR REVIEW

Three Plantronics headset patents are in issue by appeal and cross-appeal:

The Larkin patent,
the Hutchings ornamental design patent,
and the Hutchings utility patent.

Plantronics appeals as to the two Hutchings patents, from the decision of the U.S. District Court for the Southern District of New York, by Judge William C. Conner, reported at 403 F. Supp. 138, 187 U.S.P.Q. 489. The issues are:

1. On the Hutchings utility patent: Whether the District Court's holding of invalidity can be allowed to stand when the court's conclu-

sion is based on determinative findings which are contrary to the Statement of Agreed Facts and contrary to the undisputed testimony. These erroneous findings are:

- (A) That there was no long-felt need for the Hutchings invention. (Contrary to the Agreed Facts)
- (B) That prior workers had not fruitlessly searched for the Hutchings solution. (Contrary to both the Agreed Facts and unchallenged testimony)
- (C) That the Hutchings invention did not involve defiance of ancient prejudices. (Contrary to undisputed documentary evidence and testimony)
- (D) That the Hutchings invention did not meet with instant acclaim. (Contrary to the Agreed Facts, if "instant" is viewed in the proper time context)
- (E) That the Hutchings invention did not drive competitors from the market. (Contrary to the Agreed Facts)

2. On the Hutchings design patent: Whether the District Court erred as a matter of law in holding the Hutchings ornamental design patent invalid for obviousness on the express basis of subjective aesthetic taste, when it found all the facts relevant to a nonobviousness conclusion.

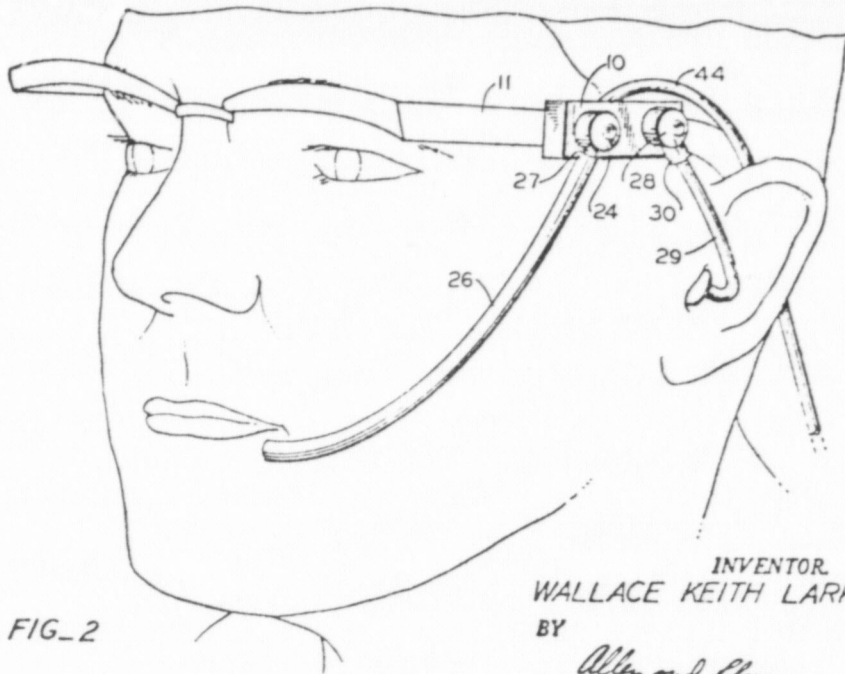
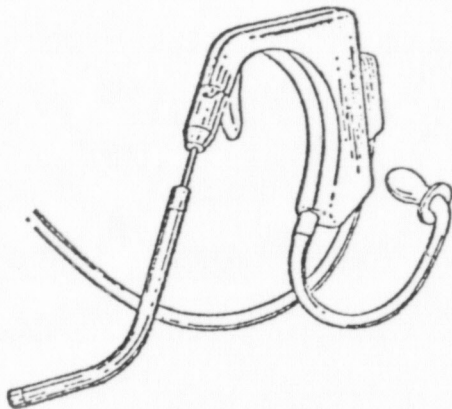


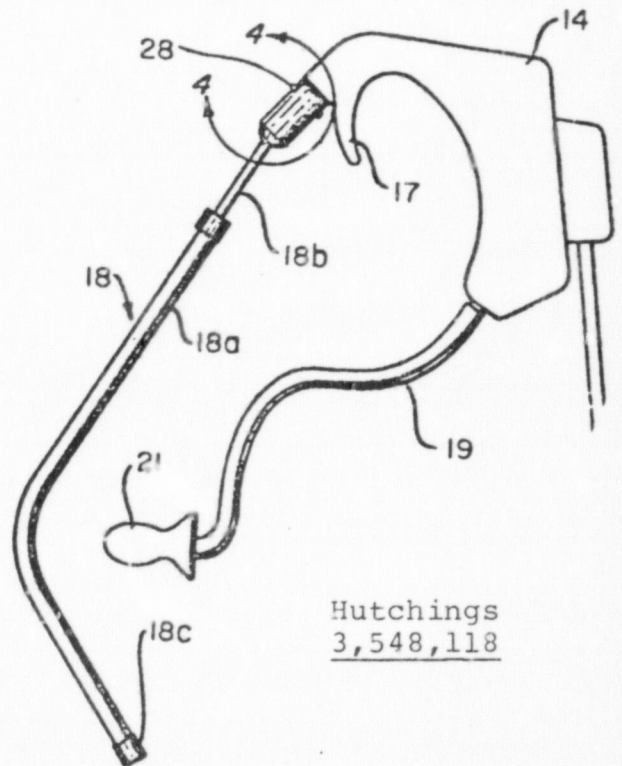
FIG. 2

INVENTOR.
WALLACE KEITH LARKIN
BY *Allen and Cherry*
ATTORNEYS

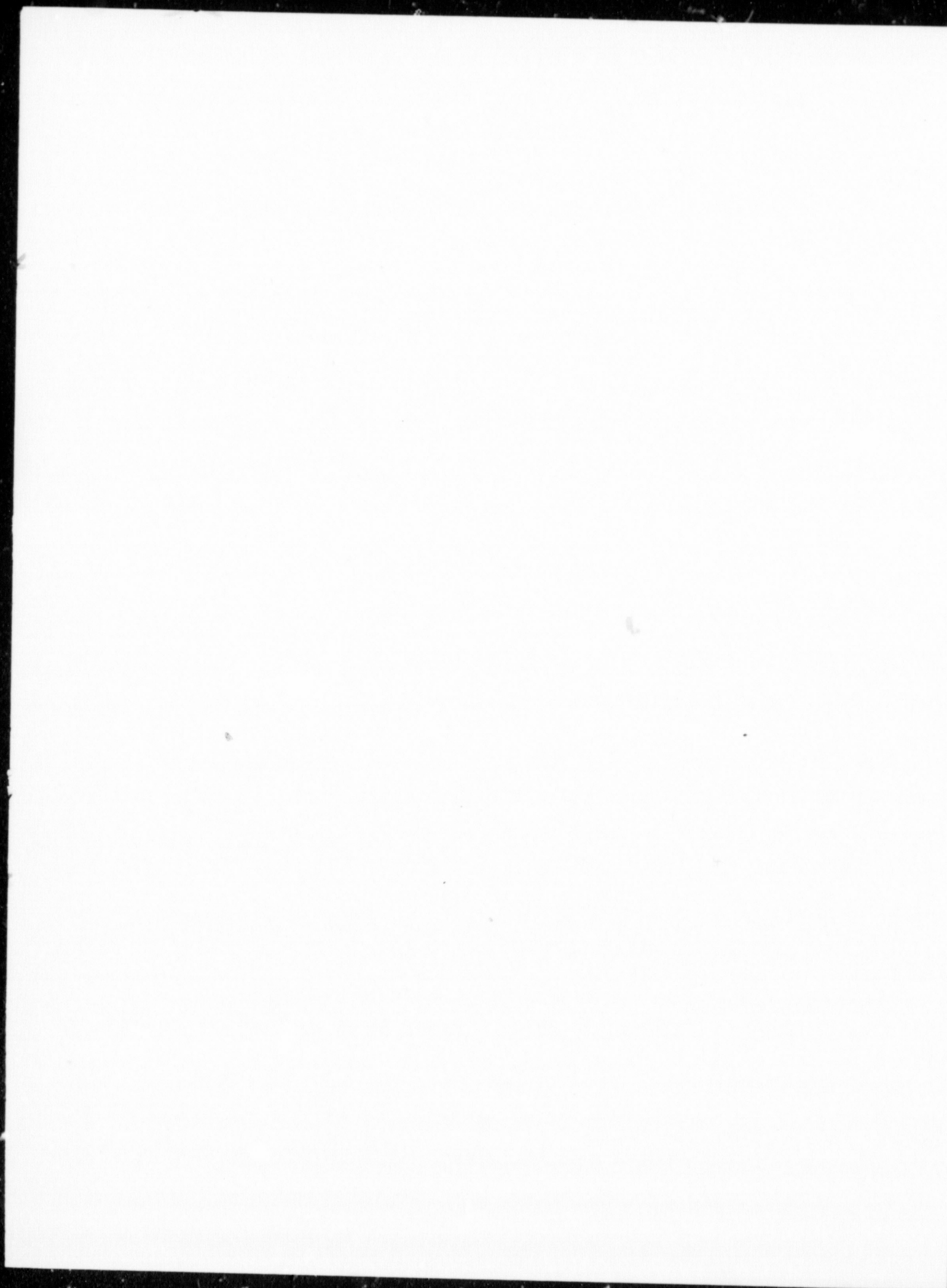
Larkin 3,184,556



Hutchings Design
Des. 218,173



Hutchings
3,548,118



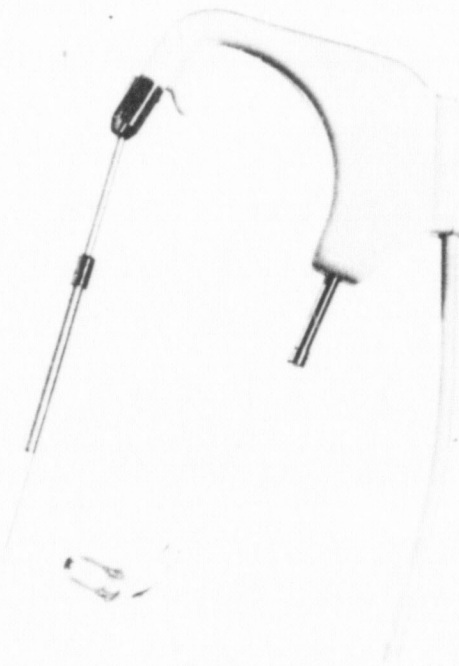
STATEMENT OF THE CASE

Plantronics (whose corporate name at that time was Pacific Plantronics) sued Roanwell and two of its subsidiaries for infringement of four Plantronics patents. By mutual agreement, the two Roanwell subsidiaries were dropped as defendants and one patent (Jensen) was dropped from the case. The trial therefore concerned three patents:

Larkin,
Hutchings utility, and
Hutchings design.

Illustrative drawings from these three patents appear in Plate 1, opposite.

Early in the case Roanwell admitted infringement as charged, both of Larkin by the Roanwell R-70 and R-71 headsets pictured below,



ROANWELL R-70



ROANWELL R-71

and of Hutchings utility by the R-70, but subsequently Roanwell withdrew its admission of infringement of Larkin. Roanwell denied that the R-70 infringed Hutchings design. Roanwell further asserted, by way of defense and by counterclaim for declaratory judgment, that the three patents were invalid and unenforceable. The parties agreed to treat claim 1 of each patent as dispositive.

Prior to trial, Judge Conner granted Plantronics' motion to strike Roanwell's answer in part, to eliminate as a matter of law Roanwell's defense of unenforceability of the U. S. patents here involved, based on allegations of fraud in connection with a British counterpart Larkin application, and on alleged illegal restrictions in a European patent license agreement which had long expired. (Opinion on motion, App. 59-60, reported at 185 U.S.P.Q. 505.)

Also prior to trial, the parties submitted an extensive Statement of Agreed Facts (App. 61-157), in order to shorten the trial by eliminating the need for proof of facts which were agreed to be correct.

Trial was to the court for five days, commencing March 17, 1975. At the conclusion of trial Judge Conner ordered the filing of post-trial briefs.

The trial court's opinion (App. 1063-1126) was filed August 28, 1975, and held that:

1. The conclusion of Defendant's copying was inescapable.
2. The Larkin patent was valid and infringed by Roanwell's R-70 and R-71 headsets as charged, and Plantronics was entitled to an injunction and an accounting for damages.
3. There was no merit to Roanwell's multifarious defenses of fraud, indefiniteness, unenforceability, incorrect inventorship and obviousness asserted against the Larkin patent.
4. The Hutchings utility patent, admittedly infringed by the Roanwell R-70 headset, was invalid for obviousness.
5. There was no merit to Roanwell's various defenses of fraud, unenforceability and double-patenting asserted against the Hutchings utility patent.
6. The Hutchings design patent was invalid for obviousness, but if valid, was infringed by the Roanwell model R-70 headset as charged.

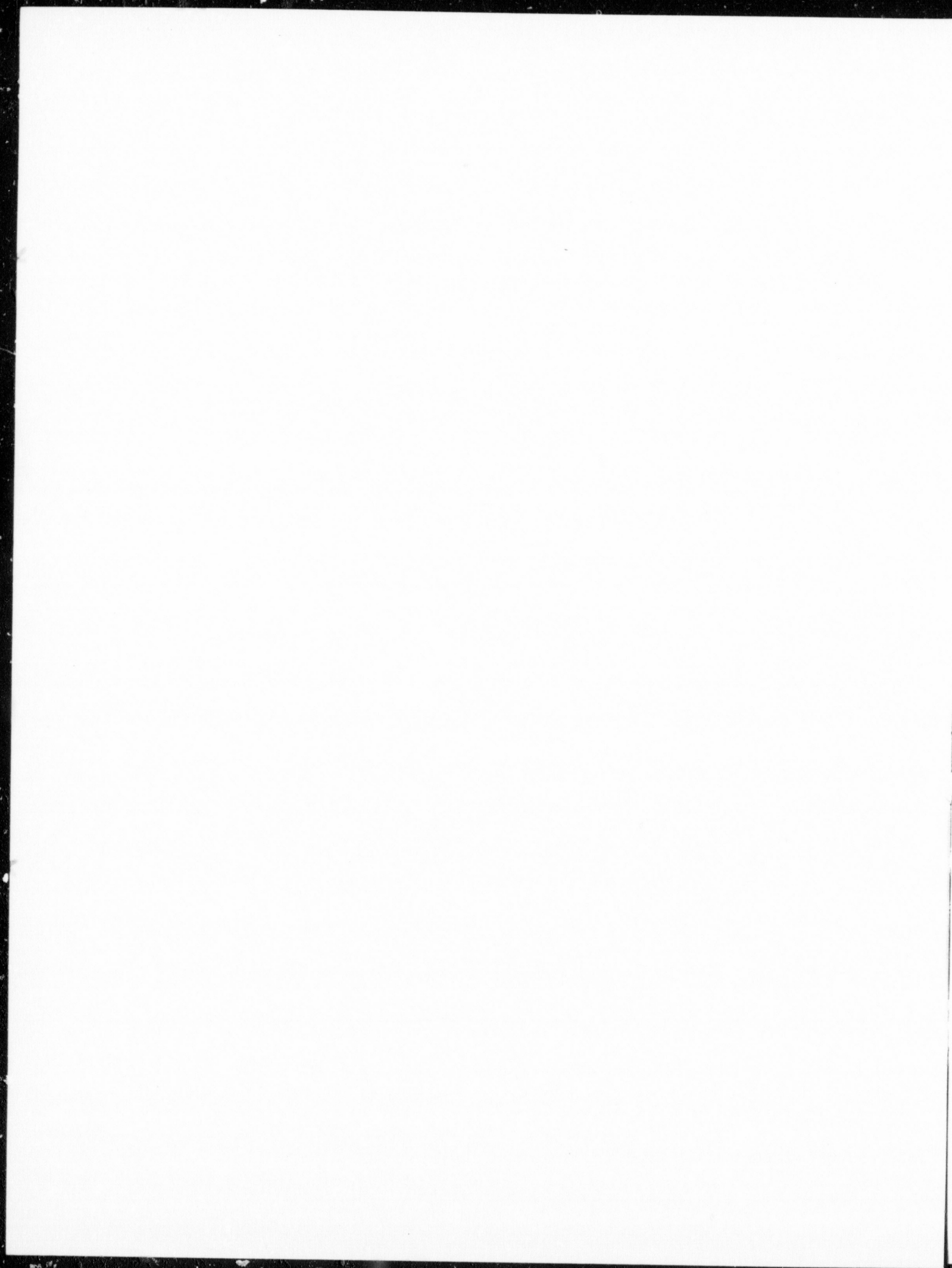
7. There was no merit to Roanwell's defenses of fraud and unenforceability of the Hutchings design patent.
8. Neither side was entitled to attorneys' fees.

* * *

Judgment (App. 1127-29) was entered October 2, 1975. Roanwell appealed to this court on November 3, 1975, from all portions of the judgment on Larkin. Roanwell's pre-argument statement indicated that the issues with respect to Larkin are validity and enforceability.

Plantronics cross-appealed on November 17, 1975, as to the judgment of invalidity of the Hutchings utility and design patents.

Upon Roanwell's motion to the district court and posting of bond, Judge Conner issued a *supra* *re* *deas* order suspending the injunction and accounting pending disposition of Roanwell's appeal to this court.



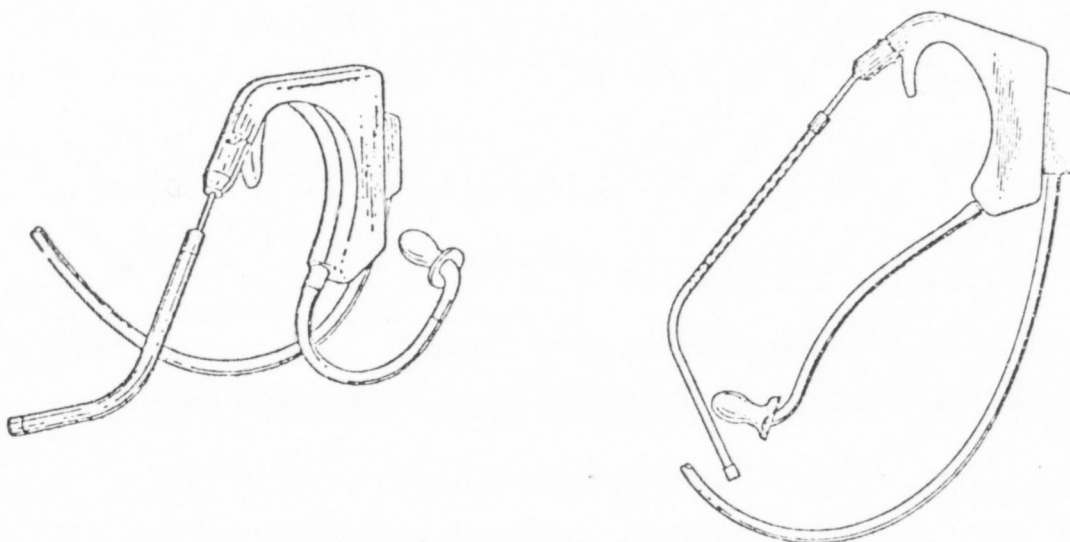
ARGUMENT

There are only two ways to judge obviousness: The reality of history, or the speculation of hindsight.

ARGUMENT RE. HUTCHINGS DESIGN

The patent vs. the copied design

The ornamental or aesthetic design of the Hutchings design patent, is for a miniature, headbandless headset that was of tremendous, dramatic commercial success. In words it may be characterized as an "angular design," and is thus:



A photograph of the accused Roanwell R-70:



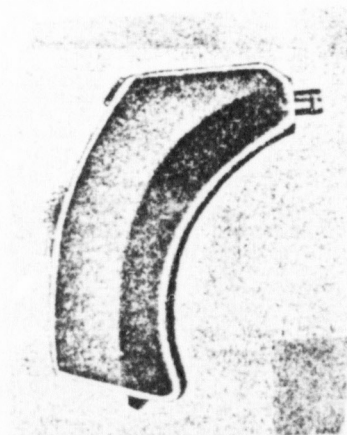
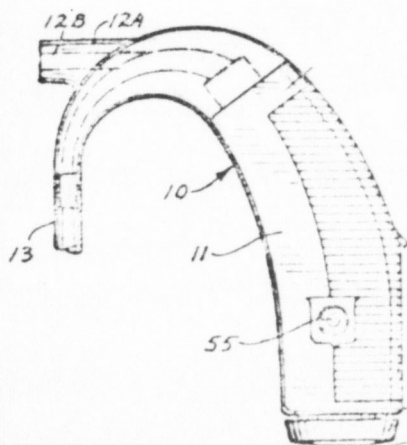
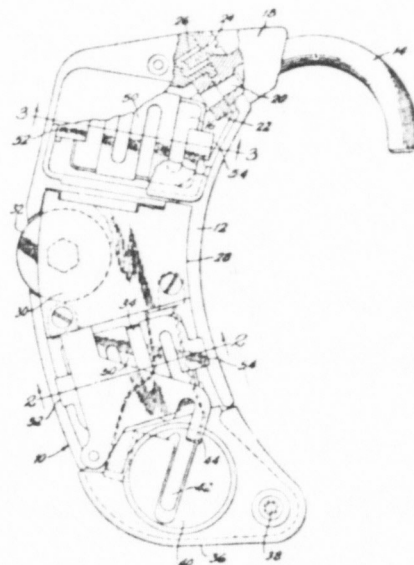
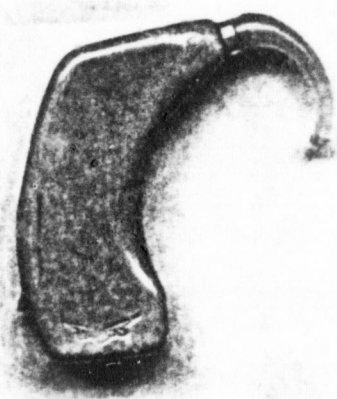
Defendant having had full knowledge of Plaintiff's design, and having admitted that "to the average layman they would look substantially the same," Ex. 142, p. 230, following all the evidence of copying the trial court correctly found the two designs:

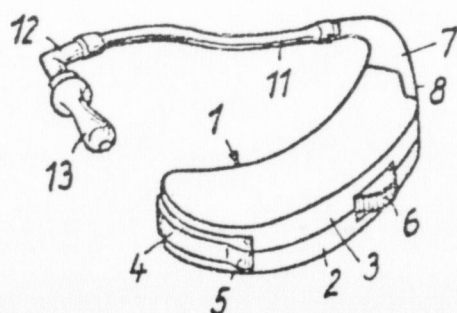
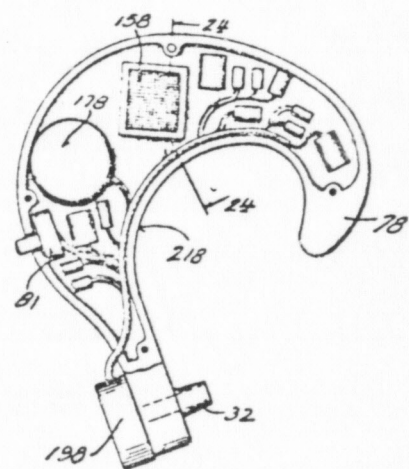
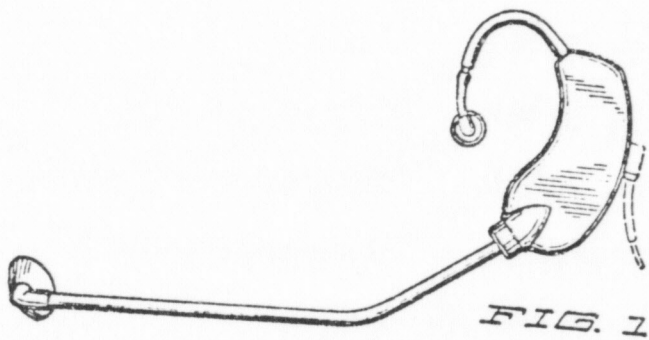
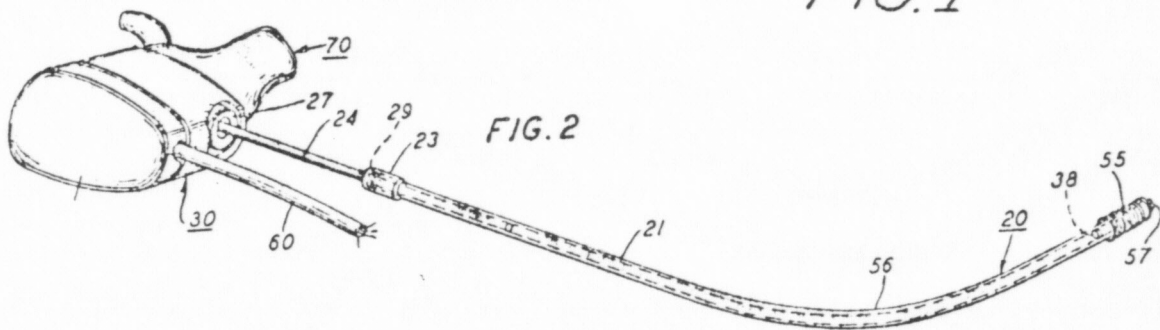
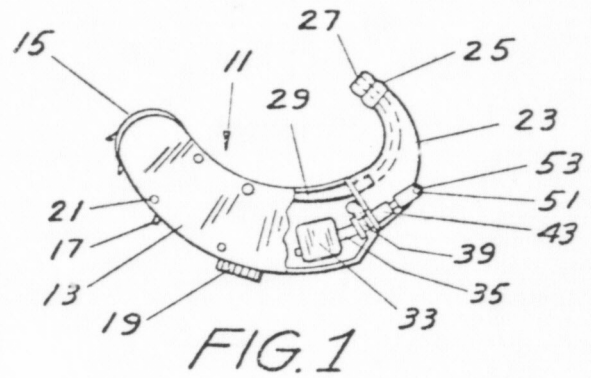
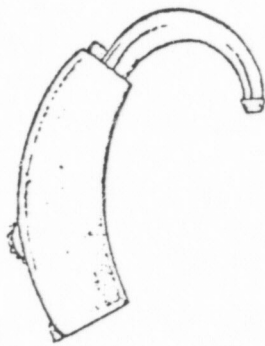
"so close, in fact, that the conclusion of deliberate copying seems inescapable." (Opinion, p. 51, App. 1117)

The patent vs. the prior art

The inventor of course had as his art source, thousands of design ideas in a haystack, with no one design telling the designer how to modify it to better aesthetic advantage. An aesthetic design, by its nature, can be played with by any designer, but a design does not teach how to change itself or what the aesthetic result will be.

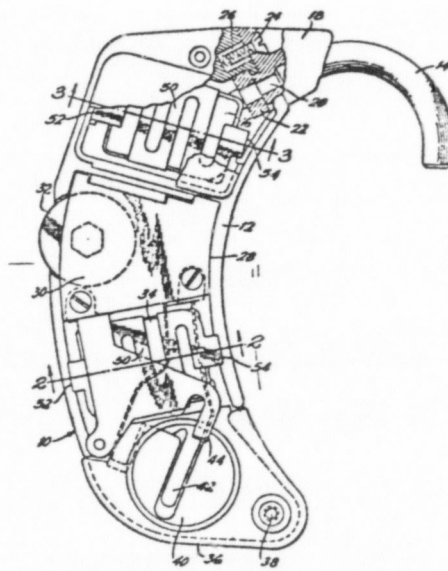
The prior-art hearing aids and headsets which the plagiarist chose to cite by hindsight reference to the patented design, include the following:





As the trial court correctly found, the accused structure is
 "much closer to the [Hutchings patented] 'StarSet' than to the
 prior art." (Opinion, p. 51, App. 1117)

Visualize now, the two references from which the trial court found the
 patented design "obvious":



WEISS HEARING AID

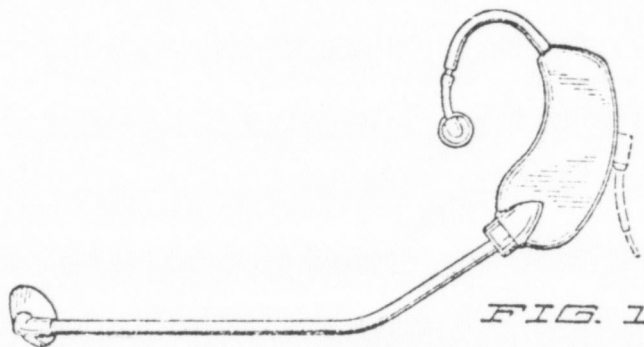


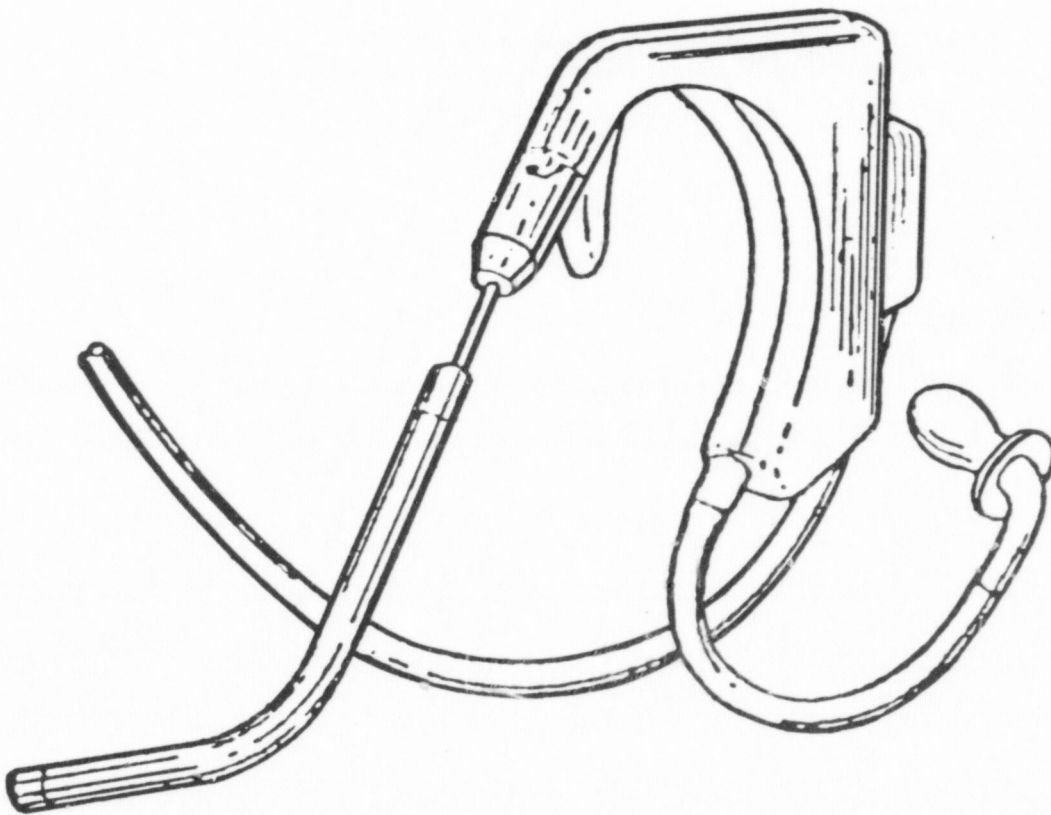
FIG. 1

Flygstad

Do those two references suggest what lines to draw to improve their aesthetics?

Do they suggest flat surfaces and angular lines as being preferred to curved surfaces and curved lines?

Do they teach *any* one design, this patented design?



The prior art taught *approaches* featuring curved surfaces and curved lines and also taught *approaches* featuring angularity and a number of planar side sections, without favor to either.

As the trial court correctly found, none of the three principal ornamental features of the patent is precisely shown in the prior art, and **none** of the prior-art designs creates the same overall visual impression. (Opinion p. 51, App. 1117)

The trial court emphasized his exercise of his personal subjective taste as the test for patentability (Op. p. 54, App. 1121). Further the trial court found that

While "the particular combination chosen by Hutchings is pleasing enough * * * [it is] no more so than any of **thousands of others** which he might have chosen

"* * * there likewise is an endless variety of different ways in which the headset housing could be given an 'angular' look — an **infinite permutation** of the number of planar side sections, of the ratios of their respective lengths, and of the angles between them." (Opinion, pp. 54-55, App. 1121-22, emphasis added).

Among an "infinite permutation" of planar sections, lengths and angles between them, how can any one of them be "obvious"?

For the art did not suggest one permutation as preferable to another.

Only Hutchings suggested one permutation as preferable to another.

And Hutchings enjoyed the highest form of flattery: Deliberate copying by his competitor. — A competitor who professed to have the country's most excellent headset designer on its own design staff. (Roanwell depo., Ex. 142, p. 67)

The meaning of "obvious"
under 35 U.S.C. 103*

The policy of our Constitution was not primarily to protect a property of the inventor if its novelty be "pretty enough" or "important enough" — whatever "enough" is.

The Constitution's policy is different. It is
 "to promote the progress of science and the useful arts"

— the primary constitutional purpose —

"by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries."

— the means to the end.

The idea: To induce commitment of private risk capital into research and development. A *system* of inducement.

Title 35, U.S.C., is the Congressional implementation of that policy — service to the public by promoting investment of risk capital into R&D.

Section 171 of 35 U.S.C. provides for patents on
 "any new, original and ornamental design for an article of manufacture"

on the theory that by providing protection of new ornamental designs, the public will be served through the inducement of capital into design improvements, so that the world we live in will be improved.

So the purpose of the law, is average return on investment in design effort, as a public service to induce others to design effort.

Obviousness in 35 U.S.C. § 103 must be measured against that purpose, not against *subjective*, personal artistic tastes.

*Section 103 provides:

"A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made."

The trial court's error

The trial judge here slipped, as occasionally do all men when judging patentability. He slipped into the error of personal subjective judgment of aesthetic appeal, and failed to follow his own correct findings of fact on the nonobviousness issue.

The trial judge fully recorded his slip in two clauses, which we quote in order reverse to the opinion. Said the trial judge, correctly:

"* * * personal artistic tastes are unpredictable and inexplicable — one viewer's mural is another's graffiti." (Opinion p. 54, App. 1120)

He also concluded, erroneously:

"* * * in the final analysis, a court's evaluation of the patentability of a design is essentially *subjective* * * *" (Opinion p. 54, App. 1120, emphasis supplied.)

The trial court used a "subjective" evaluation of "personal artistic taste." Finding the invention "pleasing enough [but] no more so than any of thousands of others" (Opinion p. 55, App. 1121), he found the patent invalid. **But for what reason?** Personal taste of the judge!

Abandoning the statutory test of obviousness to skilled designers, admittedly in favor of personal subjective taste of the judge as test for patentability, was error.

The statute sought to avoid the "unpredictable and inexplicable" legal result, which the judge admitted flows from a subjective-artistic-taste test for patentability.

The statute relies **solely** on the test of "obviousness," as to which there can be hard evidence and thereby some uniformity of court decision.

The statute does not require the design to be either more or less than "pleasing enough" to the judge's personal *taste* — only non-obvious to *those in the art*.

If the measure of patentability is personal subjective taste rather than obviousness, then clearly the same design must inevitably be simultaneously valid and invalid in different courts, the same design being "one judge's mural and another's graffiti".

If the present evidence and fact findings do not comply with the statute's requirement for patentability, nonobviousness, then what design ever will?

1. The ornamental features are not shown in the prior art. (Opinion, p. 51, App. 1117)
2. None of the prior-art designs creates the same overall visual impression. (Opinion, p. 51, App. 1117)
3. There were thousands of other ornamental designs Hutchings might have chosen. (Opinion p. 55, App. 1121)
4. There is an endless variety of different ways in which the head-set housing could be given an angular look. (Opinion, p. 54, App. 1121)
5. Roanwell's R-70 design is "so close [to Hutchings'] that the conclusion of deliberate copying seems inescapable." (Opinion, p. 51, App. 1117)

This court's 1974 law

Said this court in a design patent case:

"Some time ago this court said in a case that has been followed in the Fourth and Fifth Circuits among others,

"The imitation of a thing patented by a defendant who denies invention has often been regarded, perhaps especially in this circuit, *as conclusive evidence of what the defendant thinks of the patent*, and persuasive of what the rest of the world ought to think."

Lancaster Colony Corp. v. Aldon Accessories, Ltd., 506 F.2d 1197, 1200, 184 U.S.P.Q. 193, 195 (2d Cir. 1974), emphasis added.

Why cannot the Defendant adopt any one of the prior-art references on pages 9 and 10 above, or the "thousands of other" possible pleasing designs, all of which are open for its use, instead of being permitted to plagiarize the Hutchings design which is different "in overall visual impression" from the prior art?

THE HUTCHINGS UTILITY PATENT

I. SUMMARY OF THE ARGUMENT

Hutchings concerns a miniature, headbandless, behind-the-ear headset with a small-bore voice tube coming out the top, **over the ear**, to the mouth. It was a tremendous commercial success.

The district court found there was no long-felt need for this invention. The agreed facts prove that, at various times scattered over the last seven years prior to Hutchings, the need was felt by

Plantronics
Audiotone
British Ministry of Aviation
Telex
Bell Telephone System
Roanwell

And over the six years prior to that, the need was felt by the Panel of Experts, the Air Force, Ohio State Research Foundation, United Air Lines, the FAA, NASA, etc.

The district court found there was no fruitless search for this invention. The agreed facts are that

The Panel of Experts tried and failed
United Airlines tried and failed
United asked the entire industry for help; it failed
The Ohio State Research Foundation tried and failed

After Larkin's success, all who thereafter tried also failed:

Plantronics tried and failed
Audiotone tried and failed
Telex tried and failed
Bell Telephone Laboratories tried and failed
Roanwell tried and copied Hutchings

The district court found that Hutchings did not involve a defiance of ancient prejudices. The uncontroverted fact is that acousticians

were biased or prejudiced toward the shorter, under-the-ear, acoustic tube because it produced less attenuation of sound. Never seeing merit in any alternative, they hung in with their prejudice — until Hutchings taught them better.

The district court found that the Hutchings invention did not win instant acclaim. The agreed facts are that the FAA hailed Hutchings as "the most suitable and acceptable instrument used to date," that it surpassed the Bell System's expectations in field trials; and that it has become the system standard for most telephone companies, including Bell.

The district court found there was no driving of competitors from the market. The agreed facts are that the Bell-designed model 61 (developed 1963-68 at Bell Labs) was driven entirely from its own native market — the Bell System — by the Hutchings headset!

These erroneous findings on admittedly determinative points constitute reversible error, and are the bases of Plantronics' appeal on the Hutchings utility patent.

We urge no error of legal principles applied by the trial court to the utility patent. The trial court reached the wrong conclusion because he was mistaken on the facts.

II. THE PARTIES AND HEADSETS

Telephone operators, airline and military pilots, air traffic controllers, NASA ground controllers, ham radio operators, football coaches at games, and the like, have need for two-way telephone communication while keeping their hands free to make notes, etc.

They wear devices known as "headsets" which send and receive sound by means of "transducers" which convert electrical energy to sound, or sound to electrical energy. For example, the standard headset of the telephone industry for many years was Bell Telephone's Model W. E. 52:



* * *

This court in its recent *Timely Products** opinion, and the Supreme Court *Graham v. John Deere Co.*,** have required courts in patent cases to address the relevant history of the art.

The relevant history here commences about 1956.

At that time, 1956, Defendant Roanwell was an established manufacturer of electrically oriented products, including headsets. Its product line included specially designed headsets for

Telephone operators	Airport ground crewmen
Telephone linemen	Missile systems crewmen
Mobile radio operations	Rocket launch crewmen

*523 F.2d 288, 187 U.S.P.Q. 257 (2d Cir. 1975).

**383 U.S. 1 (1966).

Base station operators	Mine detector operators
Radio & TV broadcasters	Sonar operators
Commercial jet crews	Military aircraft crews
Air traffic control	Language laboratories
Private aircraft pilots	Home use, Hi-Fi and TV

Roanwell had in its employ in the late 50s and 60s a highly skilled staff of headset designers.

United Air Lines felt that all those headsets offered by Roanwell and others still were grossly deficient — too heavy, terribly uncomfortable, etc. United asked Defendant Roanwell and all other headset manufacturers in the world to come up with a new light-weight comfortable headset for use by its pilots.

Roanwell and others failed. United kept trying.

At that time a free-lance entrepreneurial personality, one Keith Larkin, had formed a business with an airline pilot, Courtney Graham. They called themselves Plane-Aids. They were buying Japanese sunglasses with transistor radios in the earpieces,

PLANE-AIDS' NEW *Sun & Fun Glasses*



NOW . . .
A RADIO
SPECTACLE . . .
SUNGLASSES WITH
BUILT-IN
TRANSISTOR
RADIO!



For sportsmen, fivers, boating fans, game spectators, motorists, golfers! Have more fun at the beach, fishing, picnicking. Long-life low-cost hearing-aid batteries give up to 165 hours of pleasure-filled service. Sturdy, light-weight construction. Full broadcast range for quality hi-fi reception. Slight volume fade when facing station enables fivers and boat owners to determine their general position with unique "direction-finding" feature. Now, get more fun listening to music, news, sports—anywhere, any time, with

PLANE-AIDS' NEW SUN AND FUN GLASSES.

Complete, postpaid in U.S.A.
LIST PRICE, **\$29.95**
Plus 4% Sales
Tax in Calif.

PLANE-AIDS COMPANY, P. O. Box 801, Soquel, California *Ex. 16*

DEALERS: Write for generous discounts.

44A

and selling them to raise some money for a golf-cart venture that interested them.

United heard of the sunglass-radios, asked Larkin to help the airline with its headset problems which others had failed to solve.

Larkin did. The sun-glass business evolved into a corporation, Plantronics, Inc., in 1961 to market Larkin's headset, pictured below. (Golf carts got lost in the shuffle.)



Established competitor Roanwell, on first seeing the Larkin headset, called it **"the basis of a new generation of headsets"**.

As success flowed, Bell Telephone Labs set about to leap-frog the Larkin design, and in the course of about five years of R&D effort thought it had done so with its model 61. Roanwell opted to manufacture the new Bell Telephone model 61:



Plantronics reacted to competitive invention, by commissioning a task force including one of its newer employees, one Hutchings, to out-do anything Bell could do.

And he did. He invented the StarSet at first called MS 50-80.



He out-did them, both in ornamental design, which this brief treated at pp. 7-16, and in utility design to which the remainder of this brief is addressed.

The Hutchings StarSet literally blasted the Bell Model 61 — and with it Roanwell's contract to manufacture for Bell — out of the marketplace. Totally out.

Result: Roanwell copied the Hutchings StarSet with its Model R-70 — the only set charged to infringe Hutchings.

Roanwell admits infringement of Hutchings.

* * *

Defendant apparently takes the position as to both Larkin and the Hutchings utility patent, that they are invalid for obviousness, in that it was obvious how to assemble the available components into the patented combinations, and that it is also obvious what value and comfort and stability are obtained with each of the patented combinations of components. The **facts** are contra.

Graham v. John Deere Co., 383 U.S. 1 (1966), mandates that obviousness of those inventions be determined by making three factual inquiries:

- (1) The scope and content of the prior art.
- (2) Differences between the claim and the prior art.
- (3) Level of ordinary skill in the art.

We address first, *Graham's* inquiry (1).

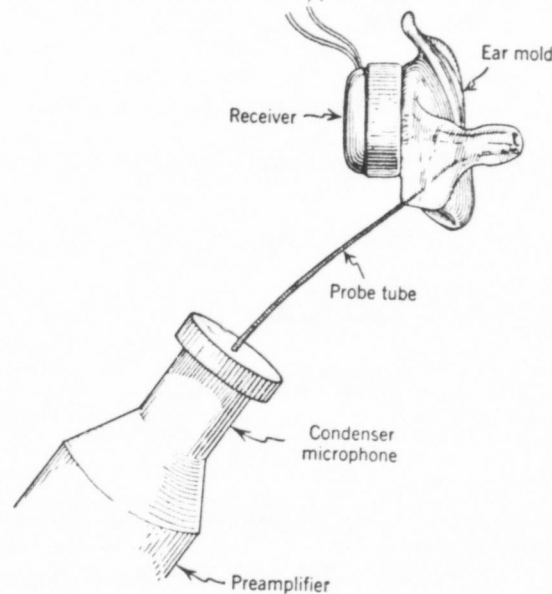
III. THE SCOPE AND CONTENT OF THE PRIOR ART

A. The components of the Larkin and Hutchings inventions were known and available by 1956

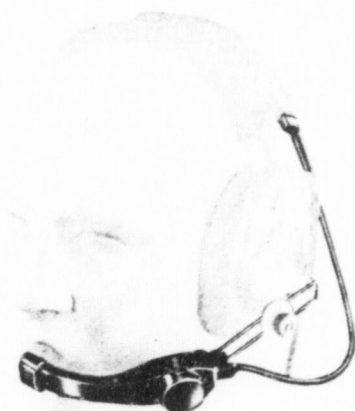
The headset prior art to Larkin is well discussed in the trial court's opinion (pp. 5-10, App. 1068-73) and is pictured in Tabs 1, 2 and 3 at the back of this brief. As we shall see, the prior art was essentially an expression of the problem which Larkin and Hutchings solved, not a suggestion of solution.

The transistor was invented in 1948. Japanese transistor radios soon flooded our markets. Hearing-aid quality transistors were stock items on the market by 1953. Miniaturized transducers are stipulated to have been stock items at least as early as 1956.

Similarly, acoustic probe tubes for picking up sounds and transmitting them to transducers were staple tools of the acoustician's trade and art pre-1956. See *Beranek* (Ex. 149), 1949:

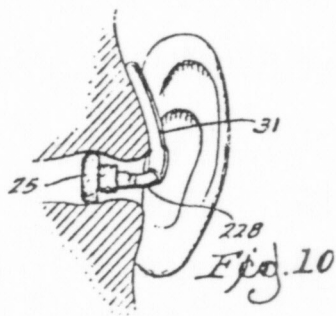


Also, voice tubes from mouth to microphone transducer were common in the RM-33 which was one of Roanwell's pre-1956 big selling stock items:



some form of

Further, tubes to the ear were in most every hearing aid walking down the street for all to see. The Henderson patent, filed in 1955 (Tab 1, back of this brief), suggests this form of ear tube among others:



Thus, all the component parts of both the Larkin patent and the Hutchings utility patent were in being by 1956 — not only in being but well and generally known by 1956.

On all of this there can be no real question.

Differences between Larkin and the prior art

Unlike the prior art pictured at back, Larkin concerns a miniature headset (Plate 2, opposite) weighing about an ounce, employing a capsule which contains a small transmitter and receiver. The capsule is mounted near, but not on or in, the ear canal. The capsule is held in position adjacent the ear by a spring clip, which can either be attached to the temple bar of a wearer's glasses, or attached to a thin plastic headband. The headset has a long acoustic tube for conducting speech from the wearer's mouth to the microphone in the capsule, and another acoustic tube from the receiver in the capsule to the wearer's ear. A line cord connects the microphone and receiver to the telephone or other communication lines through a jack. Plantronics' first commercial embodiment of this patent is called the MS-50 headset.

B. "Ear Torture," Headaches and Sore Ears Plagued Headset Users for Many Years Before Larkin

***The Air Force "Panel of Experts" (1956)
tries and fails to conquer the problem,
although all the components are available.***

In 1956, the United States Air Force found all the headsets then available so unsatisfactory that it initiated a survey which involved convening a Panel of Experts to canvass all the possible alternatives.

For three years they worked, off and on.

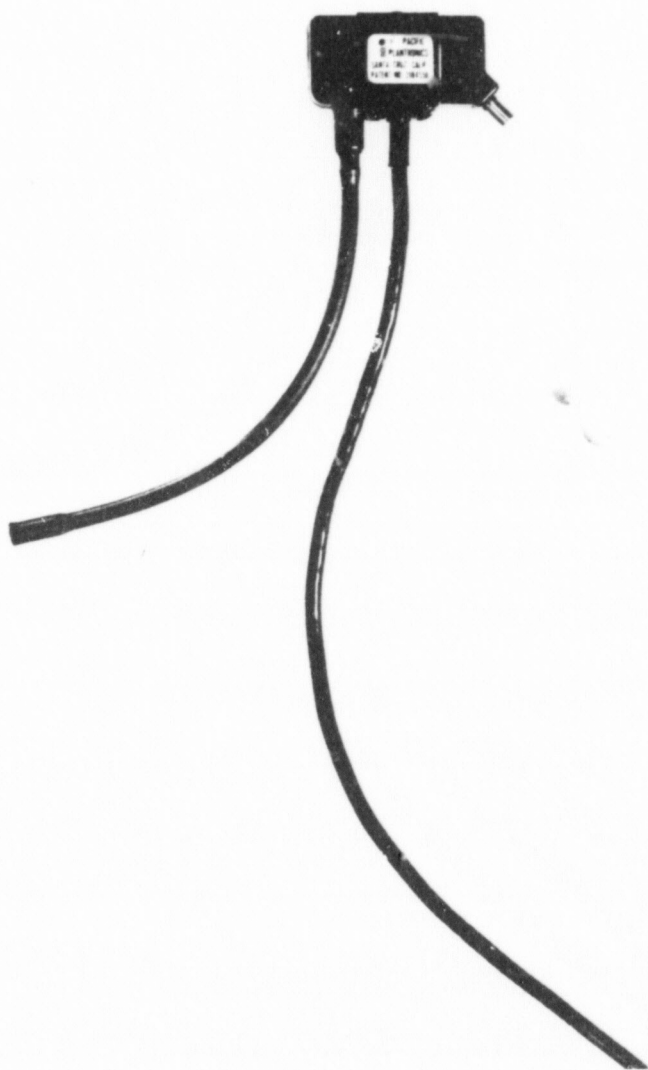
The 1959 report of that Air Force project (Exhibit 28) reads in part:

"Objective of the Program

"The basic purpose of the program was to discover and explore improved means for voice communication during Air Force operations. * * * Improvements are desired which will:

"(a) decrease the size, weight and discomfort associated with the equipment which must be worn on or about the head of the flier; * * *

"The discomfort of flying headgear is to a large degree attributable to the interphone equipment. * * * The degree of discomfort which we are concerned with here is in the category of **intolerable**.



LARKIN MS-50 HEADSET

Specifically, the complaint has been called **ear torture**. It is reported as being of such degree as to detract from the operational effectiveness of flying personnel on long range bombing missions. If a man is supposed to wear his helmet for the duration of a flight, but cannot because of intolerable pain, and without it he is not only inadequately protected, but cannot be adequately supplied with oxygen, and is inadequately prepared for emergency flight conditions, then the condition is an operational hazard. Hence **elimination of discomfort has been an urgent necessity.**"

"The first step in the program was to assemble a team, including some of the **most competent experts in the field from all over the country**. The program has been guided by a **Panel of Experts** consisting of ten individuals or groups having great experience in all aspects of the problem: electro-acoustic transducer design * * *" (Exhibit 28, pp. 2-1 to 2-2) (Emphasis added).

Defendant's expert witness, Dr. Daniel Martin, was a member of that Air Force Panel of Experts, and participated in the preparation of a chart (Exhibit 27) listing all the possible components and all the possible approaches at headset improvement. That chart is shown in the foldout attached to the page opposite.

Although the chart listed all the necessary components for the Larkin and Hutchings combinations, with acoustic tubes (both mouth and ear) high on the lists of possible components for headset use, the chart still did not enable a person of ordinary skill to make the Larkin or Hutchings headset. Dr. Martin testified to the days of "brainstorming" that went into the preparation of that chart (Tr. 517, App. 697). He then admitted:

"Q. . . . Having given your explanation, is it not a fact that the table which is Plaintiff's Exhibit 27-a, coming from the report of the committee of experts, does not teach a man of ordinary skill in the art how to make a headset that is satisfactory in terms of user comfort, low weight, high versatility and adequate voice transmitting [*Roanwell's 1962 description of the Larkin headset*] is that not a fact, yes or no?"

"A. This table does not provide sufficient information for that purpose." (Tr. 592, App. 775)

The Panel of Experts recommended the following systems as sufficiently promising (Tr. 522, App. 702) to warrant further research and development:

A tooth microphone for transmission in combination with a speaker for reception;

A noise cancelling microphone in combination with horns surrounding the ear;

A forehead (bone conduction) microphone in combination with bone conduction receiver.

Not the Larkin combination. Nor the Hutchings combination. None of the proposed ideas was ever commercialized. (Tr. 577, App. 759).

In the real world, the Panel of Experts' suggestions after three years of study, for systems "sufficiently promising" to warrant further R&D, taught not the Larkin or Hutchings invention, but *away from the Larkin or Hutchings inventions* toward the three above-listed blind alleys.

***Defendant's expert, Dr. Martin, tries
over one hundred headset combinations —
but not Larkin's or Hutchings'***

Dr. Martin, according to his testimony, was aware of the pre-1961 teachings of the prior art on which Roanwell now relies. As a member of the Air Force's Panel of Experts, he knew all the necessary components for the Larkin and Hutchings headsets. Although he worked with over one hundred types of headsets (Tr. 612, App. 794A), he never before 1961 tried the Larkin combination which has sold over 700,000 units to date, or the Hutchings combination, which has sold even faster than Larkin.

The Ohio State Research Foundation researches miniature transducers in 1956, recognizes acute comfort and health problem, fails to solve the problem.

Roanwell relied heavily at trial on the in-the-ear-mounted Dreher patent (Exhibit 97), which was prior art to both Larkin and Hutchings. During 1956-58 Dr. Dreher was working with a group at Ohio State University, under research contract from the Air Force. (The Air

TABLE II

SPEECH PROJECTION FROM MAN

"ACOUSTO"-ELECTRIC TRANSDUCER TYPE	COUPLING MEANS TO SOURCE	NOISE FIELD EXCLUSION
1. ELECTRODYNAMIC	1. AIR - EXTERNAL TO LIPS	1. PROXIMITY TO SOURCE
2. ELECTROMAGNETIC	2. PROBE TUBE TO AIR MIC.	2. NOISE SHIELD - OXYGEN MASK
3. RING ARMATURE MAGNETIC	3. THROAT CONTACT	3. HELMET ENCLOSURE
4. BALANCED OR REED ARMATURE	4. LIP CONTACT	4. GRADIENT CANCELLATION
5. VARIABLE RESISTANCE - CARBON	5. TOOTH CONTACT	5. IMPEDANCE MISMATCH (RE-LATIVE SENSITIVITY TO AIR vs. SOLID TRANSMISSION)
6. PIEZOELECTRIC	6. AIR INSIDE MOUTH	6. HELMET WITH ACOUSTIC WINDOW AND AUXILIARY NOISE SHIELD TO BE PLACED OVER WINDOW. ISOLATES BREATHING FROM MICROPHONE.
7. ELECTROSTATIC	7. EAR - DIRECT AIR	7. BAFFLE
8. MAGNETOSTRICTIVE	8. EAR - PROBE TUBE	8. TAILORING OF RESPONSE
9. ELECTRONIC	9. MECHANICAL COUPLING TO HEAD	9. CLIPPING IN TRANSDUCER
10. THERMISTOR BEAD	10. LIQUID COUPLING TO HEAD	10. DIRECTIONALITY OF MICROPHONE.
	11. AIR COUPLING TO HEAD	
	12. CHEST CONTACT	
	13. AIR - TURBULATOR IN BREATH STREAM TO ENHANCE CONSONANTS	
	14. ARTIFICIAL LARYNX TO INCREASE VOICE OUTPUT	

EVALUATION CRITERIA - (COMBINATION OF TRANSDUCER, COUPLER AND NOISE EXCLUDER)

1. NET EVALUATION OF INTELLIGIBILITY -- WORD ARTICULATION, NOISE - QUIET
2. PHYSICAL (DIAGNOSTIC) EVALUATION:
 - A. REAL VOICE FREQUENCY RESPONSE - DEFINES REQUIRED EQUALIZATION
 - B. DYNAMIC NOISE ATTENUATION
 - C. CONSONANT / VOWEL RATIO
 - D. SPEECH / DYNAMIC NOISE RATIO (CONSONANTS AND VOWELS)
 - E. SPEECH SOUND ALTERATION PROPERTIES

F. BEHAVIOR WITH ALTITUDE

3. TALKER - LISTENER ACCEPTABILITY

- A. LISTENABILITY: NATURALNESS, PLEASANTNESS (LACK OF ANNOYANCE), SPEAKER RECOGNITION, DISCOMFORT AT HIGH LEVELS (SPEECH AREA UTILIZATION)
- B. WEARABILITY - DISCOMFORT
- 4. SIZE AND WEIGHT POTENTIAL

SPEECH RECEPTION TO MAN

ELECTRO-"ACOUSTIC" TRANSDUCER TYPE

COUPLING MEANS

NOISE FIELD EXCLUSION

- | | | |
|--|--|---|
| 1. ELECTRODYNAMIC | 1. DIRECT (AIR CAVITY) TO EAR | 1. OVER-EAR CUSHION |
| 2. ELECTROMAGNETIC | 2. PROBE TUBE TO EAR | 2. SEMI-INSERT |
| 3. RING ARMATURE MAGNETIC | 3. AIR CAVITY TO HEAD SURFACE | 3. FULL INSERT |
| 4. BALANCED OR REED-ARMATURE | 4. LIQUID COUPLING TO HEAD SURFACE | (HARVIN-TIP) |
| 5. PIEZOELECTRIC | 5. MECHANICAL COUPLING TO HEAD SURFACE | 4. HELMET |
| 6. ELECTROSTATIC | 6. DISTANT AIR COUPLING (LOUDSPEAKER) | 5. EARPLUG UNDER CUSHION-MOUNTED RECEIVER |
| 7. MAGNETOSTRICTIVE | 7. LOUDSPEAKER IN HELMET - WITHOUT EAR SEAL | 6. ACTIVE ELEMENTS (ELECTRONIC) |
| 8. IONOPHONE | 8. LOUDSPEAKER OUTSIDE HELMET | |
| 9. MODULATED AIR UNIT (MODULATE OXYGEN SUPPLY) | 9. LOUDSPEAKER OUTSIDE HELMET WITH CAVITY COUPLING | |
| 10. THERMOPHONE | 10. MECHANICAL COUPLING TO HELMET | |
| 11. ELECTROPHONICS | | |

EVALUATION CRITERIA

1. NET EVALUATION OF INTELLIGIBILITY -- WORD ARTICULATION, QUIET-NOISE

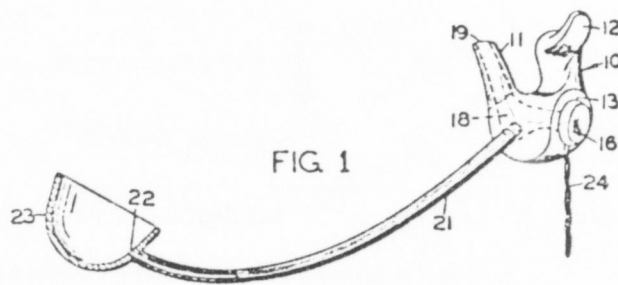
2. PHYSICAL EVALUATION:

- A. REAL EAR FREQUENCY RESPONSE
 - B. MAXIMUM SIGNAL LEVEL
 - C. NOISE ATTENUATION
 - D. MASKED THRESHOLD (COMBINES A AND C)
 - E. SPEECH/NOISE RATIO
 - F. BEHAVIOR WITH ALTITUDE
 - G. SIGNAL SUPPLY REQUIREMENTS
- 3. TALKER-LISTENER ACCEPTABILITY
 - A. LISTENABILITY
 - B. WEARABILITY
 - 4. SIZE AND WEIGHT POTENTIAL

Force felt the problem so acutely that it had this research contract out concurrently with the Panel of Experts work.)

The report of that Ohio State work (Exhibit 31) mentions a pre-existing "experimental model" of a lightweight headset including miniature Telex receivers mounted on the head, with rigid, swivelable tubes conducting the sounds from the receivers to the ears, and a microphone transducer mounted on the breast-clothing of the user and connected to the area proximate the mouth by a long acoustic tube, partly plastic-flexible and partly aluminum-bendable.

The 1958 report reveals that the Air Force experimental model did not lead the Ohio State researchers to the Larkin or Hutchings inventions, but rather to the unsuccessful Dreher earmold headset shown in the Dreher patent (Exhibit 97):



Dreher's headset and patent joined the Panel of Experts' best, in the dust-covered scrapheap of forgotten ideas never used or enjoyed by anybody.

C. The Airlines, FAA, and NASA Try and Fail — They Suffer Along With Other Headset Users, Until the Larkin Headset Appears and Revolutionizes the Industry

United Air Lines seeks long-needed help from the entire industry world-wide, including defendant Roanwell, but finds none until Larkin

The story of how Larkin's headset came to be found today in every U.A. cockpit, was blessedly preserved in United Air Lines' archives. It is re-told in pages 5-24 (App. 69-88) of the *Statement of Agreed Facts* in this case, from which Judge Conner drew a substantial and important portion of his opinion (the section entitled "United Air Lines," pp. 16-20, App. 1079-83).

This true-life history vividly illustrates the level of skill of the art before Larkin and Hutchings and for that reason we relate the story here. While it is argument, the facts stated are agreed to be true.

United's internal efforts fail, despite possession of a hearing-aid with miniature transducers and acoustic ear-tube

During 1960, United Air Lines had working a then long-standing project: A search for a communication headset to solve problems associated with the headsets then in use. (UAL Memo, Ex. 6)

United was then using the HS-33 headset shown in Plate 3.

In a memo of June 30, 1960, United's Engineering Vice President, Mentzer, described the HS-33:

"It is large, cumbersome, and uncomfortable to wear." (Ex. 6, p. 1)

The hand-held microphones were "relatively large, heavy, elusive and awkward." (Ex. 6, p. 1)

The desire for improved pilot's headphones and microphone equipment, "especially in the area of lighter weight and less cumbersome and less entangling devices," had been expressed at United before the June 1960 memo. (Ex. 6, p. 1)

United knew that there had been numerous attempts to develop lighter-weight and more convenient headsets, "such as the hearing aid type, and microphones such as the 'boom' type," but these develop-



EP 3042

Hearing Aid in Possession of United Air Lines in 1961 -- Exhibit 6



The Mentzer Mock-Up -- Exhibit 6

ments were seen to have many shortcomings: "They are, for example, still awkward, and uncomfortable to wear." (Ex. 6, p. 1)

United's awareness of the existence and availability of miniature transducers and acoustic tubes, is dramatized by the attachment to the June 1960 Mentzer memo of a photograph showing an eyeglass type hearing aid, with miniature transducers and amplifier contained in the temple bow, and an acoustic tube from the receiver to the ear. (See Plate 4, *previous sheet*.)

Armed with this knowledge, what did United do? First, they prepared what we now refer to as the "Mentzer mock-up" (Plate 5). The engineers at United, facing the problem in the real world, didn't see that "all you had to do" (to use the 1975-76 hindsight idiom) was sever the temple bar to form a capsule housing so common in hearing aids, run a voice tube to the mouth, and re-wire the device for headset use. Linstead, the Mentzer mock-up *eliminated* the acoustical ear tube and employed a front mounted boom mike. This was the standard practice in the pre-Larkin headset industry, except for noise-cancelling devices. (Romanow, Tr. 60-61, App. 237-38)

The Mentzer mock-up used no acoustic tubes, but rather a button-type hearing aid receiver, with a microphone suspended in front of the mouth by wires connected to the eyeglass frames. (Agreed Finding P-3.12, App. 74)

Both the hearing aid photo with the acoustic ear tube and the mock-up photo having been sent to Mentzer's Denver superior in 1960, still no one saw a solution. Believing the Mentzer mock-up proposal to be "too far off for our *urgent* need," his superior, J. M. Hodgson, in August 1960 ordered United's San Francisco engineering group to "review the market to determine what is available in the headphone/boom mike field," and to procure samples for evaluation. (Agreed Finding P-3.15, App. 74)

The Mentzer mock-up was never developed into an operable device. (Agreed Finding P-3.14, App. 74)

Again, evidence of an "urgent need," acutely felt for a long time by knowledgeable people, with all the necessary components before them. And no solution!

United scours the globe and comes up dry.

United's internal failure did not cause them to give up. Two engineers, Trumbull and Leonhardt, proceeded to contact every headset vendor they could locate, both in the U.S. and in foreign countries. They contacted 20-25 companies, including Defendant Roanwell. They asked what these companies could give them in the way of lightweight headsets, with transistorized amplifier and a dynamic microphone. Nineteen companies replied, twelve saying they could not meet the requirements; six of the remaining seven, including Roanwell, sent brochures or submitted samples. None proved satisfactory to meet United's needs. (Agreed Finding P-3.17, App. 75; Leonhardt depo. summary, p. 5, App. 175)

Though several manufacturers then marketed M-33 type noise-cancelling microphones with tubes from mouth to transducer, *every* sample submitted to United employed a boom-mounted microphone, located near the wearer's mouth — which dramatizes what was and was not obvious choice to those in the art then. (Please pull TAB 4.)

The Airmed Unit (Ex. 10, left panel of TAB 4), weighing about a pound, was evaluated by United as "a good boom microphone headset for the state of the art at that time, but still too clumsy, and unacceptable for United's needs." (Leonhardt depo. summary, p. 5, App. 175; Agreed Finding P-3.18, App. 75) TAB 4 also shows a brochure submitted by Amplivex, and Carter Engineering's proposed solution.

Telex submitted a prototype formed of its Twinset (Ex. 13)



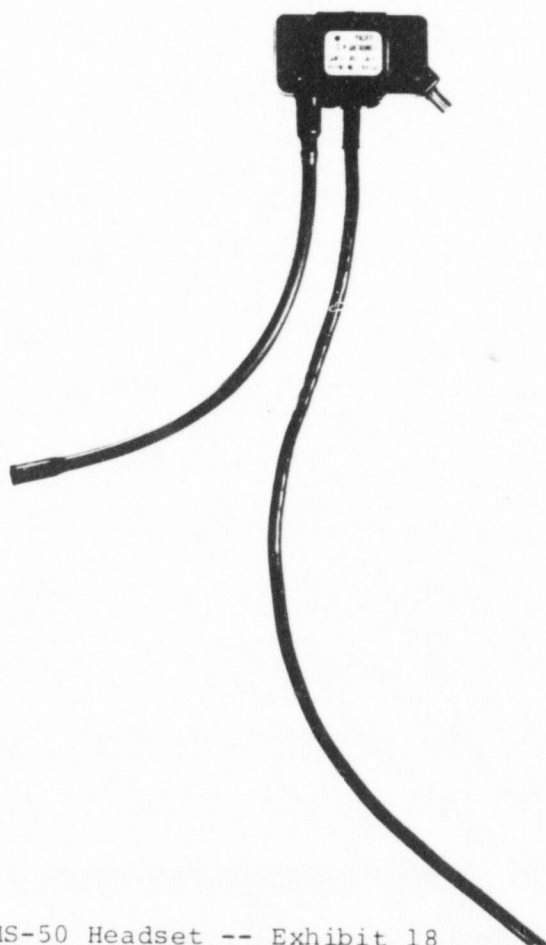
with a boom microphone mounted in front of the mouth, thus:



United liked the light weight of the Telex unit, but it was still not what they were looking for. The headset was unstable as United's Leonhardt testified:

"If you placed it there for talking and moved your head around to do other cockpit duties, this particular one would walk away or move, it would not stay there, it would reduce your output in transmissions to the ground." (Leonhardt depo., Ex. 150, p. 25)

Strange as it seems by hindsight wisdom, such was the actual, real-world, level of skill of Telex, a large, established, well-known hearing aid and headset manufacturer prior to Larkin and Hutchings. Roanwell at trial sought to make much of the Telex Twinset literature, the Gilbert patent showing the Telex Twinset, and the ARINC specification (Ex. 14) all supposedly showing obviousness of the Larkin headset. Yet, actual engineers in the real world at the time *had those items of prior art*, and found both the Larkin and Hutchings headsets anything but obvious!



Plantronics MS-50 Headset -- Exhibit 18

Plate No. 6

The net result of United's pre-Larkin search:

"Suitable stock miniature transducers, amplifiers and tubes had been available since at least 1956. Yet no one had combined them in a commercial device in a way that would satisfy United's expressed needs." (*Agreed Finding* P-3.26, App. 81)

The failure of the art to satisfy United's desperate need led them to contact Mr. Larkin — then a seller of Japanese transistor radios mounted in eyeglass frames.

Larkin solves the problem; United and other airlines standardize on the Larkin MS-50 headset

Mr. Larkin had little experience with headsets and no experience with electronic instrument design. He was not influenced by the prejudices and experiences of those with background and expertise in the art. He developed and submitted to United what became the Larkin patented headset, the "Plantronics MS-50," Plate 6, *et seq.*

United Air Lines, who had searched so long, far and wide, found their needs met by Larkin. (*Agreed Finding* P-3.30, App. 82)

The MS-50 has two miniature, hearing-aid size transducers (a microphone and a receiver) in a housing. The housing is clipped to the temple bar of eyeglass frames or to a very thin plastic headband, and the clip itself may be detachable from the housing if desired. Speech sound is led from the corner of the wearer's mouth by an acoustic tube, which is positionable there. Receiver sound is led to the ear by a shorter acoustic tube, one end of which may be plugged into the wearer's ear.

The unit weighs only about one ounce, and is equipped with a transistorized amplifier on the microphone side, mounted in a housing (not shown in Plate 6) half-way down the line cord, and adapted to be clipped to the wearer's clothing. It may be worn on either side of the head. Positioning of the acoustical voice tube near the corner of the mouth is accomplished by selecting a convenient location for the capsule. In this manner, the headset may be fitted to most users' head and ear geometries, rendering the headset "highly versatile." (*Agreed Finding* P-3.37, App. 85).

After a period of testing and evaluation, United, and many other airlines, standardized on the Larkin headset for all their aircraft. (Agreed Finding P-3.33, App. 84).

Larkin became part of the art prior to Hutchings.

***The Federal Aviation Administration faces
"headaches and sore ears" problems; after
"many years" and "numerous attempts" by others,
no solution emerges until Larkin***

The FAA story is developed in large part out of the February 1963 FAA report "Development of Lightweight Headset" (Ex. 22), authenticated and factually verified by the deposition testimony of its author, G. V. Rodgers, who "took a particular interest in this project because it involved development of a device that had been needed for a long time." (Rodgers depo., Ex. 147, p. 5).

FAA air traffic controllers of course were very large users of state-of-the-art headsets. The FAA report's page 1, against that background, commences:

"The problem

"For many years the Agency has sought an improved headset which could be worn by controllers for long periods of time without discomfort and yet provide adequate transmission and reception capabilities.

"The headsets normally issued have been described by the controllers as bulky, heavy, uncomfortable and cumbersome.

*"They have been known to produce **headaches and sore ears** after continuous wear * * *"* (Emphasis added)

"Development Effort

*"Numerous attempts have been made to provide improved headsets * * **

" * * The plan was to determine the most suitable transducer elements for transmitting and receiving and to develop an improved headset using these elements as a basis.*

"In September, 1961, representatives from Pacific Plantronics, Incorporated, came in with an idea and a proposal. [I.e., the Larkin headset design.]

"The headset which they proposed to develop appeared so ideally suited for air traffic control use that the previously planned **in-house development effort was discontinued.**" (FAA Report, Ex. 22, p. 1)

Since the "in-house development effort was discontinued" after evaluation of Larkin's 1961 proposal, it is clear that the "headaches and sore ears" problem which had existed "for many years" prior to then, extended long prior to Larkin. Similarly the "numerous attempts . . . made to provide improved headsets" also extended long prior to Larkin.

— Again here, evidence of want, long want, felt want, never satisfied by anybody but Larkin and Hutchings.

FAA standardizes on Larkin

The government report (Exhibit 22), like the United saga, gives us *contemporaneous* historical insight about the Larkin headset. FAA's engineers did *not* view Larkin as just a "routine modification" of the Telex Twinset which FAA already had, or of the many other prior-art specimens they had collected and found unsatisfactory.

They praised Larkin's invention in glowing terms, ("so ideally suited . . .") and in the ensuing years prior to Hutchings standardized on Larkin for all FAA controllers. (*Agreed Finding* P-3.48.1, App. 92)

Bell Labs tries an acoustic horn in the Y-1, fails against the Larkin MS-50

Roanwell at trial made much of the prior-art teaching of a headset employing an acoustic horn for picking up speech and conducting it to a microphone mounted on the head, such as shown in the British Spencer-Roberton Article (Ex. C.) One having knowledge of the Spencer-Roberton headset "would have" (according to Roanwell's 1975 hindsight) found the Larkin structure (and presumably Hutchings as well) "obvious." But in the real world of researchers who were there, there at the time, it was not so.

The world's largest manufacturer, seller and user of headsets is probably the Bell System.

Its problems with the Model 52 were like those described by United Air Lines and NASA. WE 52 (Ex. 7) headsets were unstable. "If you moved your head around they would slide off." (Leonhardt depo., pp. 14-15; Agreed Finding P-3.8, App. 72) The Bell System experience was that, in order to avoid "pressure points", i.e., places on the ear that got sore after a while of headset use, the operators bent the headbands of the WE 52, and this led to instability. (Bell Labs' Romanow, Tr. 52-53, App. 229-30)

Bell Labs therefore tried in the early 1960's to come up with a new and better headset.

Assuredly Bell Labs had cognizance of all the art, all the ways to go. Their own 1934 patent (Kelly, Ex. 45) showed an acoustic ear tube in a behind-the-ear hearing aid. And they had, as standard practice, used longer tubes as "probe tubes" for laboratory work, since 1933. (Romanow, of Bell Labs, Tr. 77, App. 254)

Bell Labs considered several designs, came up with the Y-1. Not the Hutchings design. Bell submitted the Y-1 to the FAA for comparative tests against the standard Model 52 and the new Larkin MS-50 proposal. The Y-1, called in the FAA report "a new headset" from Bell Laboratories, is described as follows:

"The Y-1 was somewhat lighter in weight than the 52-B and was designed for a minimum amount of adjustment by the user. The reduction in weight was accomplished by reducing the size of the transmitter and receiver elements and omitting some of the parts which were provided for adjustment of the 52-B. The microphone boom of the 52-B was replaced by a removable horn which was used to convey the speech from the mouth to the transmitter element located near the earpiece. The earpiece pressure was reduced to eight ounces as compared to fourteen to sixteen ounces for the 52-B." (FAA report, Ex. 22, p. 4; see also, to the same effect, Romanow, Tr. 64-65, App. 241-42, who directed the Bell Labs effort.)

What happened when the Larkin MS-50 and Bell's new Y-1 became available for comparative testing? Says the FAA report, Ex. 22, beginning at p. 3:

"The Oakland Trials

"Subjective trials were conducted at the Oakland ARTCC in Fremont, California, to determine the relative merits of the MS-50 headset as compared with the Model 52-B. Bell Telephone Laboratories also supplied a new headset, the Type Y-1, for comparative evaluation."

The results of the trials are tabulated in the report as to comfort, convenience, ability to hear, ability to be heard and "Overall Rating."

The Larkin unit, designed by this soldier of fortune character who had no headset background, in direct head-to-head competition with Bell Labs' best, beat out Bell Labs' Y-1 in all departments — 8 to 1 in the "Most comfortable headset" category.

The defeat of the Y-1 designed "against" Larkin (so it could have been Hutchings if Hutchings were then obvious) was so bad that it was never marketed (Romanow, Tr. 65-66, App. 242-43). Although the Y-1 was a notable improvement over the then-standard Western Electric Model 52, Bell Labs nevertheless abandoned the Y-1:

"The step forward that we hoped for was simply not good enough and although we put it in the field, we abandoned it." (Bell Labs' Romanow, Tr. 65, App. 242)

Again here, de facto proof of those of greatest skill in the art with a large budget to solve it, who long felt the need and failed to solve it, either Hutchings' way or any other way.

We shall have more to say about what was obvious from a horn-type headset, when we see what Roanwell, which was working with that type of headset when Larkin invented his, did with it.

Larkin's MS-50 becomes first outside-designed headset to win Bell System approval.

The mighty Bell System, with its research arm Bell Telephone Laboratories (inventor of such inconsequential things as the transistor and the laser) and its manufacturing arm Western Electric Co., the System which designed and built for this country the finest telephone system in the world, found it necessary for the first time in history to approve a headset of outside design and manufacture, for use in the Bell System. (Romanow, Tr. 184, App. 362)

Since then, Western Electric has been the major Plantronics purchaser for the 700,000 Larkin MS-50s thus far sold. (Hutchings, Tr. 676, App. 859)

Much has been said by courts and lawyers about the significance or lack of significance of "commercial success" as evidence of patentability of an invention. It may be that mere sales figures don't tell us much, although they certainly show a demand. **a motive for others to invent if they were able.** But here we're not looking at mere sales figures—which could sometimes be the result of factors other than the invention's merits, such as advertising. *You don't sell telephone equipment to Western Electric by advertising.* You compete with them on the merits of your goods versus their own. And *they*, a major manufacturing competitor, make the decision!

There can hardly be a more objective tribute to an invention than its purchase by Western for use in the Bell System. Bell Labs could not do better than Larkin. Outdoing Larkin remained for Hutchings—which Bell then bought.

Defendant Roanwell, for years a headset "pioneer," is aware of the need, tries its hand and produces the Roanwell "Lightweight": a half-pound unit with front-mounted mike.

Defendant Roanwell was a pioneer in new headset development since 1948. (Ex. 26, p. 2)

By 1961, Roanwell had become aware that headset weight was a big problem. (Foley, Tr. 193, App. 371) Contemporaneously with Larkin's 1961 work, Roanwell commenced a project:

"The aim was for a lightweight headset that could be used in telephone communication, could be used in television, could be used by various military agencies. It was a very wide type of expanse that we were looking for for use of this particular headset." (Foley, Tr. 194, App. 372)

Mr. Foley had been working on headset design projects at Roanwell since 1959. (Tr. 188, App. 366) Working with him on the Lightweight project in 1961-62 were:



Plate No. 7

a design engineer, Robert Wolf (Tr. 199, App. 377)
 a layout draftsman, Mr. Lamarche (Tr. 192, App. 370)
 several model makers (Tr. 192, App. 370)

They also had working in the Roanwell laboratory, Mr. Gaston Marchand, a widely known acoustics expert.

At one time in the Lightweight project, Roanwell built a prototype employing an acoustic horn for picking up voice signals. Mr. Marchand, the acoustics expert, decided to abandon that approach, and Roanwell went instead to a front-of-the-mouth mounted microphone. So to the Roanwell men who were there, there at the research desk at the time, the acoustic horn did not teach what Roanwell's 1975 hindsight reads into the horn prior art.

The lightest of four versions of the headset emerging a year or more later from that Lightweight project, appears as Ex. 134, Plate 7. It weighs half a pound. Its sales have been less than one-twentieth of either Larkin's or Hutchings'.

***Roanwell experts evaluate the Larkin headset,
 and react to the point of envy;
 they call it "the basis of a new generation of headsets"***

In 1962, shortly after Plantronics' introduction of the Larkin MS-50 headset, Roanwell evaluated that headset on two levels: Acoustics laboratory evaluation; and management evaluation.

Roanwell was then an established headset manufacturer, and had been for some fourteen years before. Its acoustics laboratory reported in November 1962:

"It seems that Plantronics has come up with a combination of
 user comfort,
 low weight,
 high versatility,
 and adequate voice transmission
 which has gained them appreciable acceptance
 (Project Mercury) in a relatively short time."

(Roanwell Acoustics Laboratory Report, Exhibit 20, page II.)

On the management side, Roanwell's Mr. Powers, a graduate engineer with many years of headset experience who is now president of Roanwell, consulted with Mr. Howell, a founder of Roanwell, and wrote in December 1962:

"We both feel that this may be the basis of a new generation of headsets or headset-microphones." (Powers Memo, Exhibit 21)

Mr. Howell then stated in December 1962, that although the Plantronics headset was finalized by an "upstart," it would be foolish for Roanwell to disregard the interest it had created among headset users. (Howell memo, Exhibit 140, page 97.) He further stated:

"As demonstrated in our own laboratory, it is so light that you hardly know when it is on your head and its qualities from an electrical and acoustical standpoint are certainly adequate for a great many uses . . . [W]e are going to be forced to get into the picture sooner or later." (Howell Memo, Exhibit 140, page 97)

NASA feels a pre-Larkin need for a comfortable headset, and finds no pre-Larkin relief

NASA controllers were experiencing a fatigue problem with the WE 52 (Exhibit 7, TAB 1 at back) headsets they used before Larkin.

"We had a lot of complaints about the WECO 52A headset from our operators' viewpoint, particularly directed toward fatigue." (Metcalf depo., Ex. 148, p. 17.)

A powerful, well budgeted agency famous for its ahead-of-the-art equipment, suffered along with the others.

NASA standardizes on Larkin

Little can be added to the deposition statement of George Metcalfe, the NASA engineer responsible for headsets at Cape Canaveral and later at the Manned Spacecraft Center, Houston: "It's an excellent headset. You can wear it for eight hours without caving in." (NASA's Metcalfe depo., Ex. 148, p. 20, about Larkin's MS-50.)

Virtually all NASA ground controllers adopted the MS-50. *Agreed Finding P-3.50*, App. 92-93) And NASA was an organization which in the 60s had the technical and money might to get whatever it needed

Astronauts became aware of the MS-50, and used it in space missions, in the so-called shirtsleeve environment in the spacecraft, and in an emergency air-sea rescue package. (Spragens, Tr. 232, App. 411)

***British Ministry of Aviation, normally cautious,
calls Larkin "A great step forward in headset technique"***

Further and independent evidence of the contemporary impact of the Larkin headset, is found in the 1962 report of the British Ministry of Aviation's "Air Traffic Control Experimental Unit." (Ex. VV)

Roanwell relies on Spencer and Robertson's introduction into the British Post Office of a horn-type headset (Ex. 46, Tab 2 above) in the 1950s as rendering Larkin obvious. Yet, how did the British government react to Larkin in 1962?

The voice tube: "Amazingly efficient." (Ex. VV, p. 3.)

The headset:

"There can be little doubt that this represents **a great step forward** in headset technique. Normally equipment which is a *radical departure* from accepted practice in the ATC field is regarded with caution and reserve but in the case of this headset, despite its being *completely different* from any in past or current use, the 'acceptability factor' can be rated as 'Very High.' (Ex. VV, p. 4, emphasis added)

D. Conclusions About Larkin — and Hutchings

Judge Conner had mountains of support for finding Larkin non-obvious and his patent valid. How Roanwell could argue obviousness in the court below, in the face of the huge mountain of contemporaneous evidence to the contrary, without "slipping into hindsight" as condemned by the Supreme Court in *Calmar*,* is difficult to see — and since Hutchings uses the same readily available components as Larkin and solves all the pre-Larkin problems as fully as Larkin (no other post-Larkin worker did), Hutchings was equally nonobvious all those years, and another eight years as well, as we shall see.

E. Patent System in Action: Pioneering, Dominant Invention Spawns Improvement Efforts by Many

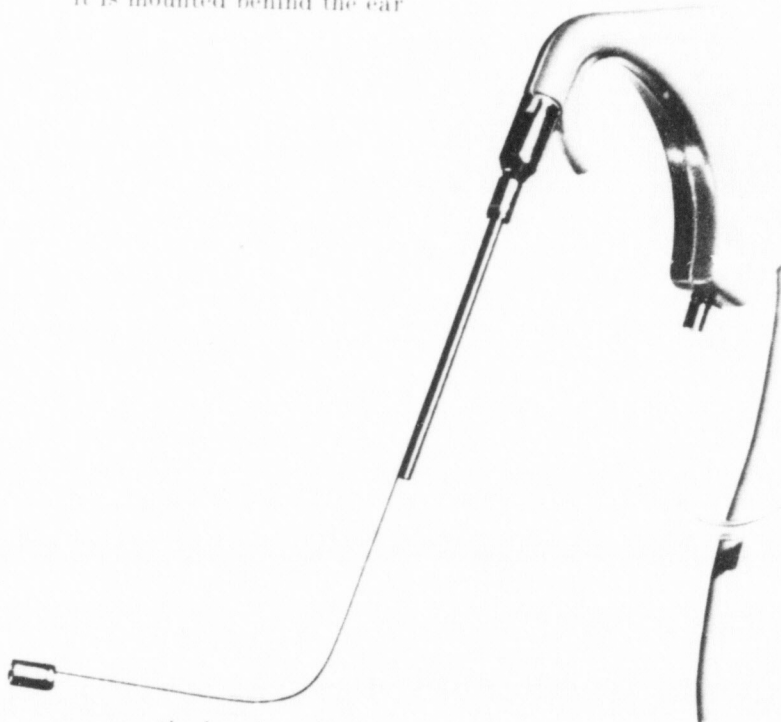
Revolutionary though it was for FAA, NASA, the airlines and many other users, the Larkin headset was not the last word in headset technology. On the contrary, Roanwell's prophecy came to pass: Larkin was but the "first of a new generation of headsets."

As attested by Mr. Frank Romanow, a contemporary observer of Larkin and Hutchings, and the man then in charge of all headset design at Bell Telephone Laboratories: Larkin set a new comparison standard for judging comfort and wearability of headsets; Larkin was the first to demonstrate that good voice transmission was achievable in a miniature headset; and Larkin led to the development of numerous new designs for miniature headsets. (Tr. 114, App. 291)

* *Calmar v. Cook Chem. Co.*, 383 U.S. 1 (1966), which noted the duty of courts to "guard against slipping into use of hindsight," 383 U.S. at 36, quoting *Monroe Auto Equipment Co. v. Heckethorn Mfg. & Supply Co.*, 332 F.2d 406, 412 (6th Cir. 1964), cert. denied, 379 U.S. 888 (1965).

F. HUTCHINGS: THE FIRST STABLE POST-AURICLE HEADSET

The Hutchings StarSet is a "post-auricle" headset, meaning that it is mounted behind the ear



as were the hearing aids introduced circa 1960-65 (disclosed in earlier patents, e.g., Kelly, 1934).

The court will recall from the discussion of Larkin above, that the 1961 Larkin miniature headset, while sorely needed and universally applauded over what had been done before, was mounted on the head in either of two ways: By clipping the headset capsule to the temple bar of eyeglasses or sunglasses; or by clipping it to a thin, light headband.

During the 1960's, with the advent of contact lenses (i.e., no eyeglass frames) and teased-up hair styles, pressure existed and grew for the headset industry to produce a miniature headset which was

technically satisfactory from a communications viewpoint, but which would not require any headband or eyeglass frames for support.

The story of what the industry did in efforts to meet those needs, is told in the Agreed Facts of this case, and in the uncontroverted testimony of Frank Romanow, who headed all of Bell Labs' efforts in this area. But before we see that contemporaneous evidence of the skill of the art, we must go through the first two of the three factual inquiries enjoined on all the courts by *Graham v. John Deere*, 383 U.S. 1 (1966).

The scope and content of the prior art

The prior art to Hutchings (1969) is, of course, the prior art to Larkin (1961) set forth above, plus Larkin, plus several intervening items. Many of these other items are discussed in Judge Conner's opinion (pp. 36-38, App. 1101-1103) and need not be repeated here.

However, there is an Agreed Fact about the pre-Hutchings art, which is very important to keep in mind when looking at the history of the headset art: Workers in the headset art before Hutchings in fact *knew* that behind-the-ear hearing aids with microphones and sound inlets *on the top* existed on the market. Indeed, behind-the-ear hearing aids were in the art even before Larkin. Kelly 1934, Ex. 45, Henderson Ex. 44. Yet despite this knowledge, all these headset workers went the opposite way from Hutchings, and were commercial failures!

The important Agreed Fact (P-13.1, App. 125) reads:

"Hearing aids with top-mounted microphones were **widely and commonly** known prior to Hutchings, as evidenced by the thirteen patent and literature references cited herein by Defendant Roanwell."

"Widely and commonly known"! So we need not indulge in technical guess-work or in hindsight speculation so common in patent cases; we can and will *see* where that knowledge *in fact* led skilled designers before Hutchings.



Plantronics
StarSet

Roanwell
R-70

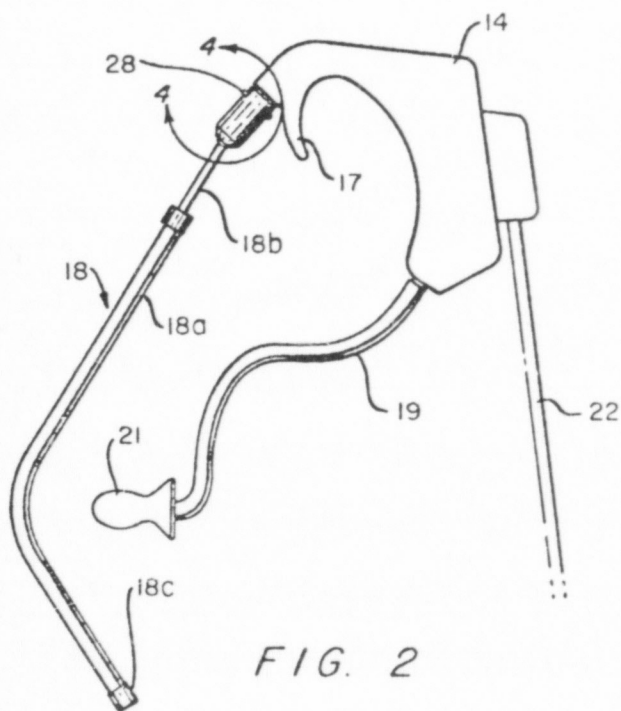


FIG. 2

Fig. 2 of Hutchings 3,548,118

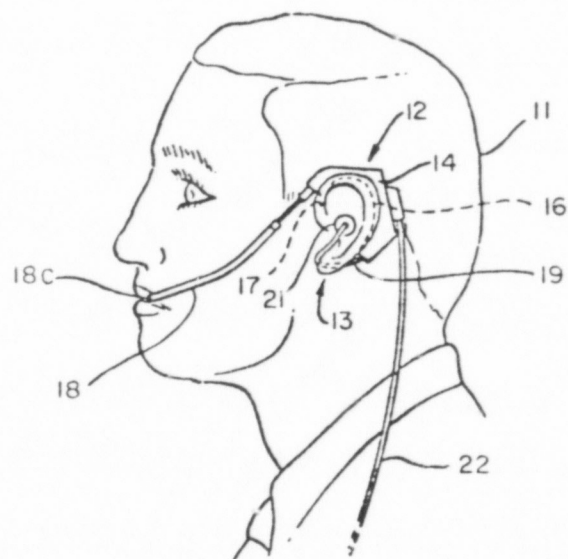


FIG. 1

Fig. 1 of Hutchings 3,548,118

Differences between the Hutchings invention and the prior art

Both the Hutchings StarSet and Roanwell's R-70 are, and claim 1 of the Hutchings utility patent (Ex. 2) defines, headsets which mount behind the wearer's ear, i.e., post-auricle headsets. They need no head-band or other auxiliary support device. The Plantronics StarSet and Roanwell R-70, and some of the patent drawings, are reproduced as Plate 8, to show how the units are constructed and worn.

The voice tube extends from the *top* of the capsule, down toward the corner of the wearer's mouth. **It is most important that the open end of the speech tube be stably located during use.** Unlike hearing aids, small movements of the end of a headset voice tube cause a serious drop-off in the voice signal onto the telephone lines.

These movements are usually caused by side-wise tilting of the wearer's head, or by shaking his head.

Hutchings was the first to see that mounting the *voice tube from the top* of the capsule, while farther from the mouth, would produce *less* movement of the tube's open end, for a given small movement of the headset capsule during use.

Secondly, Hutchings mounted the receiver in the bottom of the capsule, and, after some initial layout work with both acoustic tubes coming out of the top, brought the ear tube out the *bottom* of the capsule and into the ear. This plugging-into-the-ear being a fairly firm connection, even greater stability for the headset was attained, since the receive tube then acted as a kind of anchor for the capsule.

Prior-art attempts at a post-auricle headset uniformly went the other way, putting the voice tube *on the bottom*, as shown in the Flygstad patent of Telex Corp. (issued 1966), *infra*, p. 53. Small movements of the capsule away from the head caused significant displacement of the voice tube in relation to the wearer's mouth. As we shall see, they failed in the marketplace.

G. The District Court Was Clearly Erroneous on the Determinative Historical Facts

The district court rightly sought to deduce the level of ordinary skill from historical facts of what artisans were actually doing before Hutchings, and how they reacted when the Hutchings invention appeared. The court erred in finding those facts, and in expressly refusing to give weight to the correctly found fact that Roanwell, whose own efforts had gone the other way, deliberately copied the Hutchings invention.

The first error: Finding that there was no long-felt need for the Hutchings invention (1969)

The district court found (Opinion, p. 42, App. 1108) that "The record as to Hutchings establishes no long-felt need" The facts are *contra*.

The need extended back to 1956 as above developed. And after 1961:

(a) 1962: Plantronics feels the need for a post-auricle headset, and goes the wrong way

Shortly after the successful development of the Larkin MS-50 headset by Plantronics in 1961, an unsuccessful effort was commenced at Plantronics in 1962 to eliminate the need for a headband or eyeglass frame to support the headset. Some of the reasons for this effort are stated in Bell Labs' Bryant patent on its Model 61 (Ex. 70, filed 1965), which describes some of Bell Labs' efforts to meet the need for a headbandless headset:

"Headbands are inherently bulky, add to the headset's cost, and must be maintained and stored. For some applications as, for example, when other heavy headgear must also be worn, headbands are frequently inconvenient or unsuitable. Moreover, to a large number of hairdress-conscious women operators, *headbands of any type are anathema* because of their bulk and tendency to snag and disturb the hair." (Col. 1, lines 52-61, emphasis added)

Plantronics' effort at a post-auricle design led to the MS-43 headset pictured in Ex. 66 (Plate 9). The voice tube comes out the



MS-1 POST-AURICLE TYPE HEADSET
USED IN SWEEP AND SERVICE
EVALUATION

bottom, and the ear tube out the top. (**Agreed Finding D-60**, App. 154) The headset was undisputedly a commercial failure, as found by the district court. (Opinion, p. 36, App. 1101) "Helping" Plantronics on this MS-43 project, were highly skilled and experienced engineers at Audiotone Company. (See **Agreed Finding D-58**, App. 153)

**(b) Audiotone feels the need, and joins
Plantronics on the ill-fated MS-43 project**

Audiotone was brought into the Plantronics MS-43 post-auricle development because of their knowledge and experience, especially with hearing aids. Audiotone's presence on the MS-43 project further proves the long-felt need. A company like Audiotone does not undertake projects to develop products for which they don't see a market, a customer demand.

Audiotone felt the need for a good post-auricle headset in 1962.

**(c) Telex feels the need in 1963, and produces
the Flygstad headset — also a commercial failure**

The undisputed evidence of long-felt need — which the district court erroneously found not to exist — goes on and on.

Telex Corporation, long a recognized leader in headsets, hearing aids, and other communication equipment, filed a patent application (Flygstad et al, Ex. 67) on a post-auricle headset, in 1963. Commercial companies do not normally file patent applications on devices for which they don't feel there is a need, either immediate or future. Telex perceived the need in 1963, six years before Hutchings; the Flygstad application said:

"In the prior art with which this invention is concerned, much effort has been directed to provide lightweight, comfortable and efficient headsets." (Ex. 67, col. 1, lines 13-15)

After noting the deficiencies of headband- and eyeglass-mounted headsets, the Flygstad application went on to disclose a post-auricle headset, having the *voice tube out the bottom* and the ear tube out the top, as depicted in Plate 9, opposite p. 48.

The Flygstad headset, like the Plantronics/Audiotone MS-43, was a commercial failure. App. 303-04, 1035. We cite the Telex effort here as undisputed evidence of need that was felt as early as 1963.

(d) Bell Telephone Laboratories sets out to surpass Larkin: The Model 61 project (1963-68)

It is undisputed that Bell Labs sensed a need for a headbandless headset at least as early as 1963 (see *Agreed Finding* P-10.12, App. 116), and acted on it with big budget and many people. Bell's effort was big enough that they even employed the expert aid of the Henry Dreyfus organization for the ornamental design of the Model 61. (Bell Labs' department head Romanow, Tr. 183, App. 361) It is also an Agreed Fact that Bell Labs' effort was "in reaction" to the advent of Plantronics' MS-50 [the Larkin headset]" (*Agreed Finding* P-10.12)

Frank Romanow was the man who headed the long effort (1963-68) at Bell Labs leading to the Bell Model 61, which, as we shall see, was driven from Bell's own marketplace by the Hutchings StarSet. We will not here detail the number, skills, and efforts of those highly-skilled-in-the-art Bell Labs people who worked with Mr. Romanow. Suffice it here to note that their effort resulted from a need felt throughout the Bell System, as reflected by *Agreed Finding* P-10.24 (App. 118):

"American Telephone and Telegraph expected Models A and D [which emerged from the long Bell Labs project] to become standard equipment for operators throughout the Bell System, the Model A to be used primarily by new and temporary employees and the Model D to be the standard set for most Bell employees."

As it turned out, Models A and D (later called 60 and 61, respectively) failed to meet that large and pervasive need. The Hutchings StarSet met it.

(e) Roanwell senses the need — again

Defendant Roanwell first sensed the need when United Air Lines asked Roanwell and all others in the industry for a light weight headset in 1961 — and Roanwell in its 1961-62 effort came up with

another heavy device that has hardly sold at all by comparison with Hutchings. Skip then to 1969:

Early in the summer of 1969, Roanwell became aware that the deficiencies of Bell's Model 61 (which it was then manufacturing on subcontract from Western Electric) were so great that a headset of new design was needed. (Foley, Tr. 206, App. 384) Again sensing need Roanwell began work on its crash MOH (Miniature Operator Headset) project.

In July 1969, Defendant Roanwell learned the structure of Hutchings invention by way of a Plantronics brochure (Ex. 140, pp. 57-59) which was received by Roanwell's Mr. Potter and routed to all key personnel. It told them everything they needed to know about the StarSet. The brochure is mounted opposite p. 60 hereof.

Roanwell's Sales Department, after learning about Plantronics' new StarSet, in the words of Roanwell engineer Foley,

"felt that they **had to have** what we would call a 'me too' product." (Foley, Tr. 211, App. 389, emphasis added.)

A "me too." What a candid choice of names!

The feeling of need had now become acute.

No long-felt need! It was attested to by Roanwell's own engineer and headset designer!

**(f) Users' reactions reflect their long need
for the Hutchings invention.**

In addition to all the foregoing volume of undisputed and formally agreed facts reflecting long-felt need for the Hutchings headset, consider the following **Agreed Facts** (P-14.8, 9, 11, 16; App. 129-30), which show how actual users reacted to the Hutchings invention and demonstrated their need for it:

"The results of the [1970] StarSet product market trials were highly favorable and surpassed AT&T's expectations. On March 22, 1971, the StarSet was officially made available in the Bell System to Subscribers." (P-14.8)

"By early 1972 the Hutchings StarSet was enjoying wide customer acceptance within the Bell System as a subscriber offering." (P-14.9) — i.e. Bell customers were buying.

"In early 1972, after presenting the R-70 and R-71 headsets to several telephone operating companies, Roanwell observed that the R-70 headset, admitted to infringe the Hutchings patent, would be favored over the non-infringing R-71." (P-14.11)

"In early 1970, Roanwell's sales representative concluded that an independent FAA evaluation showed the StarSet to be the 'most suitable and acceptable instrument used to date.' (Whitney (Roanwell) memo-Ex. 110) Based upon the evaluation, the FAA wrote to AT&T requesting that the new StarSet be made available for FAA installations." (P-14.16)

* * *

We must also recall that the various "ear torture" and "headaches" needs which Hutchings solved in a manner even better than Larkin's 8-year earlier solution, existed for workers to solve in different ways at least from the Panel of Experts' 1956 effort, and the Ohio State, FAA, NASA, United Air Lines' acutely focused searches for solutions, on through 1968 except for Larkin's dramatic step.

The trial court's finding of "no" long felt need cries out for reversal as clearly erroneous.

The second error: Finding that there was no fruitless search for the Hutchings solution

The district court was also clearly erroneous in finding that "The record as to Hutchings establishes . . . no fruitless search." (Opinion, p. 42, App. 1108)

We have in the above section on long-felt need, set forth some of the 1961-69 efforts of pre-Hutchings workers to design an acceptable *headbandless* headset:

Plantronics
Audiotone
Telex
Bell Labs
Roanwell

And we have set forth 1956-61 effort to find relief from "ear torture" "headaches," etc., by any form of light weight headset, with or without headbands, namely the work of the

Panel of Experts
Ohio State University Foundation
United Air Lines
FAA
NASA
Roanwell

Except for Larkin's one alternative solution, which was incomplete as to the headbandless point, all these searches were "Fruitless" for two reasons, shown by the Agreed Facts:

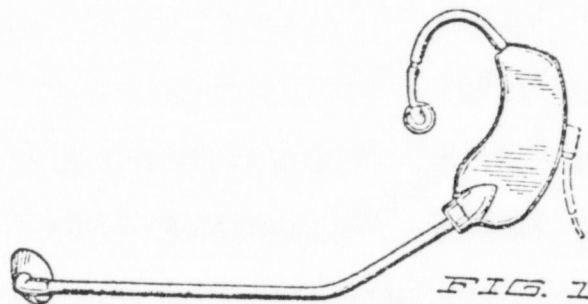
- 1) None of them found the Hutchings structure.
- 2) They were all commercial failures.

* * *

Let's briefly review only the pre-Hutchings efforts after Larkin.

The MS-43, built by Audiotone for Plantronics in 1962, had the voice tube out the bottom. (See Plate 9, *supra*.) According to a later Plantronics report (introduced by both sides, Ex. 66 and Ex. X-5), the MS-43 failed commercially because it was unstable. When the operator moved her head, the voice tube swung away from her mouth. Plantronics/Audiotone's search was fruitless.

The Flygstad headset, designed by Telex around 1963, similarly brought the voice tube out the bottom.



FLYGSTAD HEADSET

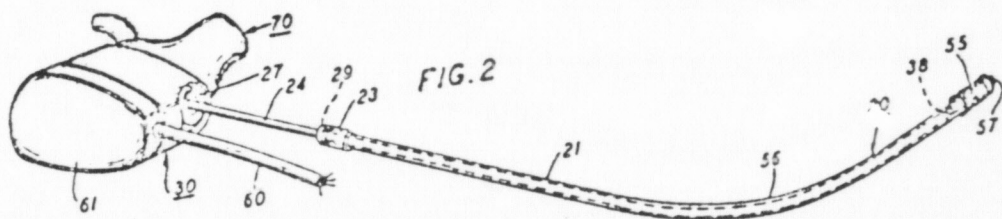
We don't know what happened to this headset, only that Telex did not successfully bring it to public notice and enjoyment. (Romanow, Tr. 126-27, App. 303-04; Mol., Tr. 848, App. 1035) Telex's search was fruitless.

* * *

Around the same time, the team at Bell Labs undertook to study all the possible ways of building a headbandless headset, which was "hoped to outdo Larkin if we could." (Romanow, Tr. 120, App. 297) They came up with four possible designs (called Models A, B, C and D), *none of which was post-auricle*. This model 61 project extended over the 1963-68 et seq. time frame, extending well after the post-auricle hearing aid had become the standard of the hearing aid industry. Bell had considered the post-auricle approach, with a behind-the-ear lucite hook, but

"the outlook for stability was so poor in our [Bell's] own estimation that we just abandoned it." (Romanow, Tr. 124, App. 301)

The outcome of all of Bell's efforts was the Model 61, pictured thus:



BELL LABORATORIES MODEL 61

It is an in-the-ear headset, wherein the capsule 61 is supported by an insert 70 custom molded to fit one of the ears of each user. This headset, despite all the fanfare surrounding its development, is now defunct, having been replaced by Huchings' StarSet (**Agreed Findings** P-14.4, 5; App. 126).

Bell's 1963-68 search, undoubtedly the lengthiest and best financed of all the pre-Huchings efforts, was also fruitless.

* * *

At Roanwell the earliest layout drawings of a post-auricle headset (August 1969, after having disclosure of Plantronics' MS 50-80 headset, later called StarSet) uniformly show the voice tube *under* the ear. (Roanwell depo., Ex. 142, pp. 186, 189). Thus, at first Roanwell failed to see *value* in mouth-tube-over-the-ear even when they saw the structure.

Roanwell's engineer, Mr. Foley, said at trial that he thought there were some early Roanwell sketches showing an over-the-ear voice tube, but these sketches were not to be found during discovery or at trial. (Tr. 223-24, App. 402-03) And if these missing sketches ever existed, they were never developed into a usable headset. The pre-Hutchings search at Roanwell was, like those at the other competitor companies, fruitless.

* * *

Since it is uncontrovertible that Hutchings fully satisfies what was being sought by

The Panel of Experts, 1956-59
Ohio State Research Foundation, 1958
United Air Lines, 1961
FAA "for a long time prior to 1963"
NASA 1963 etc.
Plantronics 1962
Audiotone 1962
Telex 1963
Bell Labs both in its Y-1 and later its
Model 61 project, 1963-1968 et seq.
Roanwell in its MOH project, 1969.

the trial court finding of "no fruitless search" for Hutchings is clearly erroneous.

Indeed, it conflicts with the court's finding that there was a fruitless search re Larkin, since Hutchings is even better than Larkin at solving all the pre-Larkin problems.

The third error: Finding that the Hutchings invention did not involve a defiance of ancient prejudices

This erroneous finding appears on page 42 of the district court's opinion. (App. 1108.)

We have thus far not talked very much in technical terms about headsets. This is because several of the principal problems faced by headset designers are *human engineering* problems and unpredictable. For that reason, Mr. Romanow's headset-design group at Bell Labs included a Ph.D. statistician (Tr. 44-45, App. 221-22). Said Romanow about human factors:

You could anticipate them but you could never really be sure, because the reaction to comfort and to stability was very difficult to find out in the laboratory." (Tr. 46, App. 223)

Roanwell's Mr. Mol (well proven to be a superior designer by his own testimony) agreed that the principal headset problem was human engineering. (Roanwell depo., Ex. 142, p. 266.)

But there *were two* ancient technical prejudices before Hutchings, and they *were* defied by Hutchings: *Prior art workers thought that if you are conducting sound in a tube you should take the shortest acoustical path*, and they felt they had to minimize interference with eyeglass frames over the ear at almost all cost.

The use of a longer tube was not regarded as impossible or intolerable. That is almost never the case in the inventive process, for it is almost never that a supposed law of physics is directly controverted by the inventor. In fact, the db loss due to the added tube length in Hutchings' StarSet is relatively small.

What is fact is this: As a pre-Hutchings designer, you knew that added length of an acoustical tube was detrimental; it distorts with resonances and attenuates the sound conducted by the tube, as taught by all the leading texts on the subject and not controverted by anyone in this case. (See, e.g., Beranek, *Acoustic Measurements*, Ex. 145, p. 72 (1949)). Therefore, *unless you perceived the advantages* of the Hutchings headset, with its *longer* mouth tube over the ear, you would

be biased to take a shorter path from the mouth to the microphone transducer, i.e., an under-the-ear voice tube.

This bias is dramatically proved by a 1963 memorandum of Audiotone's head engineer on the ill-fated MS-43 project, J. R. Johnson. The memo, Ex. 111, is beautifully poignant in its contemporary, **non-hindsight** revelation of the real level of skill in the real art:

"After discussions with Court [Graham] and Keith [Larkin, both Plantronics officers], I am of the opinion that the best way to design the behind-the-ear job is to bring the tube out the bottom instead of over the top. If you will study facial structures I am sure you will agree that this is about the *shortest route* and simplifies the problem of separating input and output. In addition, this will give a *better balanced* device which I feel will hang well on the wearer's ear. It will also simplify the problem of [interference with] the user's glasses." Ex. 111, emphasis added.

And so artisans believed and acted. As Romanow testified (Tr. 129, App. 306):

"People always strived for having — if you *had* to have a tube, let's have the shortest possible tube."

Hutchings was the first man on earth to see that by putting the voice tube near the top of the capsule where its path was longer and its potential interference with eyeglasses greater, brought importantly improved stability; and that bringing the ear tube out the bottom and plugging it into the ear, achieved even more stability!

No defiance of ancient prejudices?

* * *

The trial court's finding that the Hutchings invention did not involve the defiance of ancient prejudices is clearly erroneous. Reversal is requested of this finding.

The fourth error: No "instant" acclaim

What is "instantaneous" depends on the industry context. The Bell System, and other U.S. telephone systems, do not overnight evaluate, approve, and purchase anything. Not even things designed by their

own R&D units. And *especially* not things designed by outside suppliers and offered in competition with their own products.

The district court's finding of no instant acclaim for the Hutchings invention (Opinion, p. 42, App. 1108), is clearly erroneous.

We begin by looking once again to the **Statement of Agreed Facts**.
At the FAA:

"In early 1970, Roanwell's sales representative concluded that an independent FAA evaluation showed the StarSet to be the 'most suitable and acceptable instrument used to date.' Based upon the evaluation, the FAA wrote to AT&T requesting that the new StarSet be made available for FAA installations. (Agreed finding P-14.16, App. 130)

At Western Electric and AT&T:

"In early 1970, Western Electric ordered 4800 of the Hutchings StarSets for field trials to be conducted in the Illinois Bell and Pacific Telephone Companies. The basic aims of the trials were to determine user acceptance, identify the scope of the market and evaluate the technical performance of the StarSet.

"The results of the StarSet product market trials were highly favorable and surpassed AT&T's expectations. On March 22, 1971, the StarSet was officially made available in the Bell System to subscribers.

"By early 1972 the Hutchings StarSet was enjoying wide customer acceptance within the Bell System as a subscriber offering.

"In early 1972, after presenting the R-70 and R-71 headsets to several telephone operating companies, Roanwell observed that the R-70 headset, admitted to infringe the Hutchings patent, would be favored over the non-infringing R-71."

(Agreed Findings 14.7, 8, 9 and 11; App. 129)

At an industry convention:

"In August 1970 the StarSet received an Industrial Design Award, given for creative industrial design solutions, by the Western Electronic Show and Convention." (Agreed Finding 14.17, App. 130)

"No" instant acclaim, said the trial court. The finding of "no" acclaim cries out for correction. The most telling acclaim of all, however, was the ultimate defeat of Bell's much-touted, heavily financed, skillfully designed model 61 headset, which brings us to the fifth error of the district court.

The fifth error: That the Hutchings invention did not drive competitors from the market

The clearly erroneous nature of this finding (also on p. 42 of the district court's opinion) is shown by the text and charts of the **Agreed Findings**.

Bell and Roanwell seem perhaps to have been a bit slow in getting the Model 61 on the market only in 1970 when its development had been near completion in 1968 when the Plantronics "Task Force" was told to out-do Bell's Model 61, thereafter to come up with the Hutchings MS 50-80 or StarSet.

As a result both the Bell Model 61 and the StarSet got on the market near the same time as seen from the sales charts on the next two pages.

The charts reveal that as model 61 sales fell, StarSet sales rose. (Agreed Finding P-14.6, App. 126-28, including the charts.)

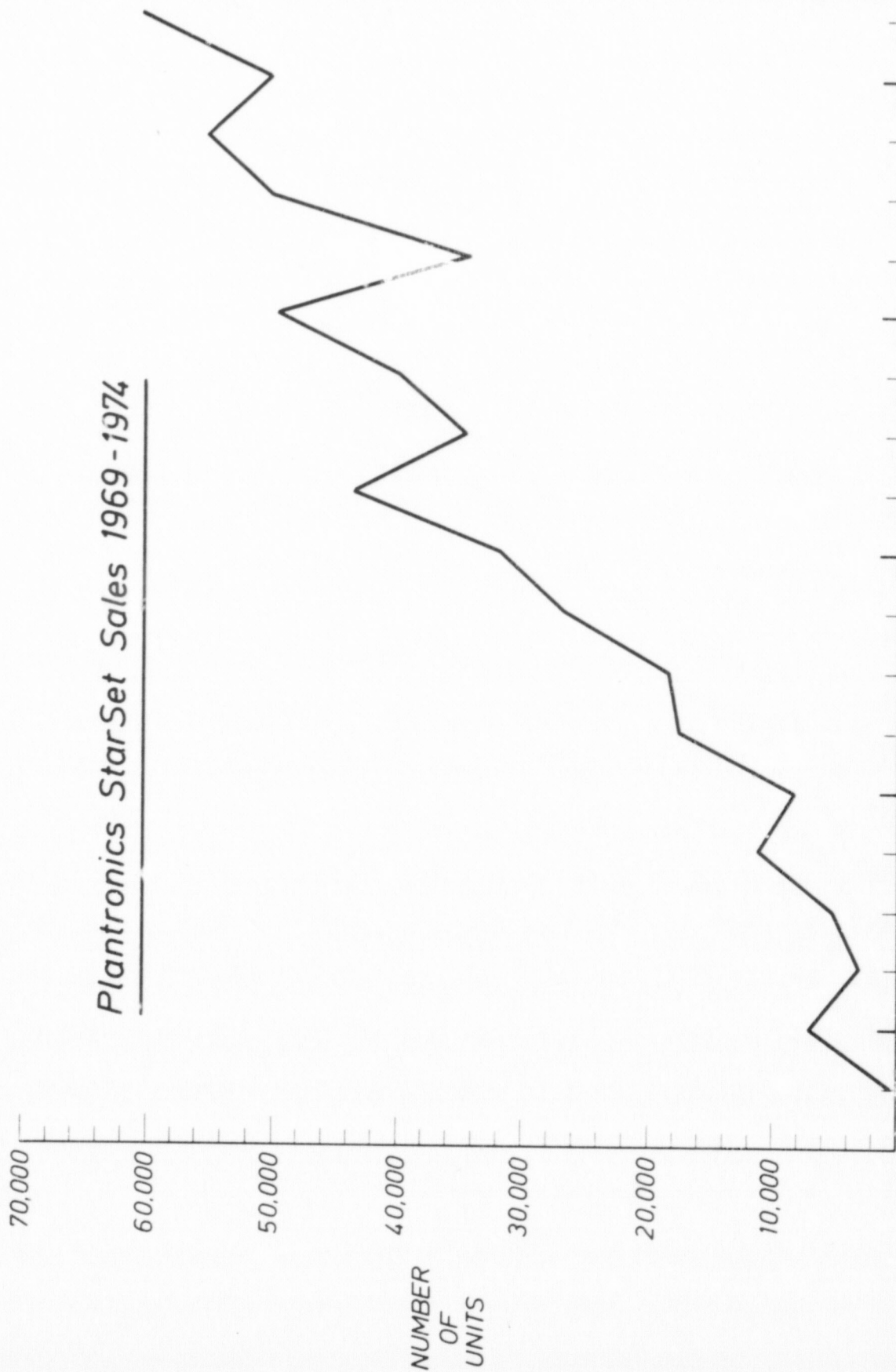
All earlier post-auricle headsets having been failures, they were of course not on the market when the Bell 61 and the Hutchings StarSet were introduced.

The Model 61 was the only headset by a competitor which Hutchings *had a chance* to drive from the market. And he did.

The district court itself found that Western Electric, the Bell System purchasing arm, has standardized on the StarSet (Opinion, p. 42, App. 1107)

The court's finding that Hutchings' invention did not drive competitors from the market is thus seen to be inconsistent with its own earlier finding. It is clearly erroneous, and must be reversed.

Plantronics StarSet Sales 1969-1974



The sixth error: Failure to give evidentiary weight to Roanwell's copying

Judge Conner found that the Roanwell R-70 was so similar to the Plantronics StarSet that

"the conclusion of deliberate copying seems inescapable." (Opinion p. 51, App. 1117)

However, he emphasized that *absent a valid patent* or confusion as to source of the goods, copying is lawful, as though that answered all the points of the copying argument. (Opinion, p. 43, App. 1109) With due respect, that begs the question.

Validity is the very thing we're trying to determine — by evidence of nonobviousness, of which the copying here is a very relevant part.

That Roanwell was acutely interested in doing new and better things than its competitors is revealed by its focusing, as the trial court phrased it, "a well-coordinated program" of espionage against Plantronics. (App. 1108) Roanwell by now had confidence in the innovating capacity of its own stable of headset designers, for Roanwell's designated witness, headset designer Hans Mol who himself was quite superior, adamantly urged that Mr. Morrison, formerly of Bell Labs but by then of Roanwell, was the country's best headset designer. (Roanwell depo., Ex. 142, p. 67) Yet they felt it necessary to engage in espionage, leading in July 1969 to Roanwell's receipt of the brochure on the opposite page. It told them all they needed to know about the StarSet.

When the country's best designers are interested in new products as here, and then copy in lieu of innovating on their own (by which act the public might have been served with yet different or better headsets), the act of copying by such experts is its own independent evidence of nonobviousness to those experts.

The district court's **error** in refusing to give evidentiary weight to Roanwell's copying, is pointed up by this court's statement in *Lancaster Colony*, *supra*:

"Some time ago this court said in a case that has been followed in the Fourth and Fifth Circuits among others,

"The imitation of a thing patented by a defendant who denies invention has often been regarded, perhaps especially





**YOUR PERSONAL
MS 50-80 HEADSET**

from 001579

PACIFIC PLANTRONICS, INC. FE15.1

JUL 1972

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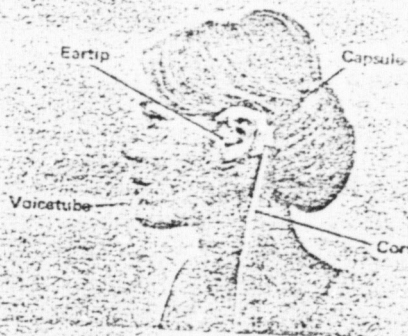
elements of your new MS 50-80 headset
developed for astronauts in the U.S. aerospace
industry. A rugged headset, it is dependable even
in constant use. It provides distortion-free voice
transmission and reception.

A special feature of the MS 50-80 headset is its
switch-gain control which is incorporated
in the earpiece. This is activated entirely by sound,
and automatically reduces volume when no one is
talking. This feature serves to increase clarity of
transmission and to reduce background noise.

At home, around the office, the MS 50-80 headset
offers the convenience to perform a variety of
tasks: typing, filing, paperwork and dictation
without leaving the seat and interrupting the flow of
work. The long, extremely lightweight cord
of the MS 50-80 gives you complete mobility over a
wide working area.

The MS 50-80 headset weighs no more than a smile; it
rests comfortably on one ear without the necessity of
adjusting it. And when in use it almost disappears. It is
compact, with a transparent voicetube, and
it is concealed behind the ear. It is scientifically
designed for comfort; it won't slip; it fits any
face, and it may be worn with or without
earplugs. Following the few simple instructions
on this folder, and you can forget everything
about it but the sound in your ear.

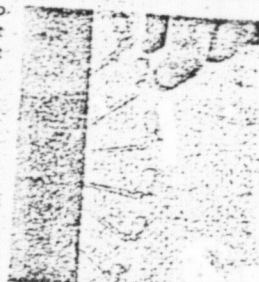
YOUR PERSONAL MS 50-80 HEADSET





How to Assemble Your Personal MS50-80 Headset

Select the eartip
that fits best
from the set of six that
comes with the headset.



The eartip should rest
lightly on the rim of the
ear canal. It should fit just
snugly enough to stay in
place and muffle room noise.

Wearing an eartip
that is too small or too
large can cause discomfort,
poor sound reception.
Under no circumstances
should an eartip be worn
which is small enough to
enter the ear canal.

Push the clear
plastic tube of the eartip
into position on the capsule
with eartip pointing
forward as shown.



JUL 11 1972

Pick up
the left hand
right hand
(Wearing
left ear
convenient to
pe
then hangs

Hold the ur
against the
hood

Slip cap
by rotating ro

JUL XX

How to Put on your MS 50-80 Headset

as shown, with
d for left ear, or
nd for right ear.
the unit on the
is usually more
or right handed
opla — the cord
on the left, out
of the way.)



Gently insert eartip.
Clear plastic tube should be
shaped as shown, with a
smooth curve.

it over the ear
head, with the
k well forward.



Hold capsule steady
to adjust length and angle
of voicetube. Slide voice-
tube in position.

tube into place
wards the back
of the head.



Tip of voicetube should be
half-way between the
middle of the mouth and
the corner of the mouth, a
quarter of an inch below
lower lip. It is important
not to speak directly into
the tip of the voicetube.

To ke
wear
relief
fixed po
the body
just loose
a full tu

Women
attach
supplied
be worn

Men may
relief

The
adjust
button

JUL 21

Keep cord in place,
 with the strain-
 clip attached to a
 position in front of
 you. Cord should be
 long enough to allow
 movement of the head to
 left or right.
 You may wear the clip
 attached to the lanyard.
 The lanyard may be
 worn either as a sash or
 as a loose necklace.



Attach the strain-
 clip to shirt front
 or pocket.

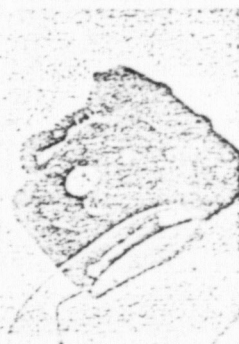


Strain-relief is pre-
 installed. Squeeze the
 cord to adjust length
 of cord.



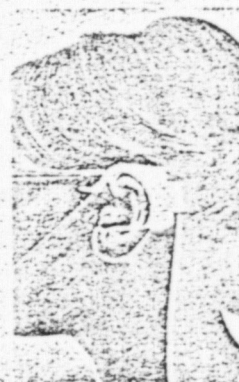
Office Convenience Telephone Rest

The telephone rest sup-
 plied should be clipped to
 the right side of the tele-
 phone as shown, level with
 desk top, and forward. Use
 this rest to hold the
 MS 50-80 headset safely
 when it is necessary to
 leave the desk. The set fits
 into the rest as shown, ear-
 tip inside, cord away
 from telephone dial.



Glasses Stabilizer

The MS 50-80 headset may
 be worn with glasses
 without any special adjust-
 ment. For those who
 prefer, the headset may be
 supported on the bow
 of the glasses with the clip
 supplied for this purpose,
 in position as shown.



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Cleaning

Keep your MS 50-80 headset in perfect working condition, simply keep it clean. When necessary, remove eartip from headset and wash it gently with plain warm water or alcohol; dry immediately. No other maintenance is required.

Doublecheck

select the eartip that fits perfectly — not too large; not too small.

let the eartip fit gently against the rim of the ear canal.

keep the tip of the vocatube halfway between the center of the mouth and the corner of the mouth, and a quarter-inch below the lower lip.

keep your MS 50-80 headset clean. Eartip is washable in plain warm water or alcohol.

VER wear an eartip small enough to enter the ear canal.

VER wear an eartip that is too large. An improper fit may cause discomfort or impair sound reception.

VER speak into the vocatube with the tip directly in front of your mouth.

VER let the eartip soak in water after washing.

Follow these simple rules, and your MS 50-80 headset will reward you with long, trouble-free service.



wherever communications are improving

JUL XX 1972



in this circuit, *as conclusive evidence of what the defendant thinks of the patent, and persuasive of what the rest of the world ought to think.*" 506 F.2d at 1200, 184 U.S.P.Q. at 195 (2d Cir. 1974), emphasis supplied.

Or to slightly paraphrase the Supreme Court's expression on this point:

The defendant gives the praise of its words in this court, to the prior art; but it gives the tribute of its action in real life technology, to the patent.

See *Diamond Rubber Co. v. Consolidated Rubber Tire Co.*, 220 U.S. 428, 441 (1911).

The trial court, it seems clear, erred in failing to appreciate the evidentiary significance of copying by expert technologists; for *that* copying by that kind of person, is strong evidence of nonobviousness to those renowned experts, and hence *a fortiori* to the man of ordinary skill in the art, under § 103 of the patent statute.

The final error: Finding what skilled artisans would "presumably" have done

Long ago in this brief, when we discussed "The scope and content of the prior art" to Hutchings, we noted the **Agreed Finding** (P-13.1, App. 125), that

"Hearing aids with top-mounted microphones were **widely** and **commonly** known prior to Hutchings . . ."

We have now seen that despite that "wide" and "common" knowledge, post-auricle headset designers before Hutchings all *in fact* put the voice *tube* and microphone *on the bottom*.

The district court speculated in 1975 after knowing the invention well, that

"One starting with the hearing aid of the German patent [with top-mounted microphone and tube] would *presumably* have done

the opposite [of what the real workers did.]" (Opinion, pp. 40-41, App. 1106)

"Presumably"! Is that the kind of "clear and convincing *evidence*" required to snatch the fruits of an invention from the hands of the man who created it and the company which financed him against staggering odds?

Where in the prior art is there a suggestion that a headset worker should select that particular German patent as his starting point for design when he had hundreds of other ideas more readily at hand against which to commence his work? No one but Hutchings thought of the idea of starting with an idea like the German. Roanwell's designer Mol indeed saw a hearing aid of that very kind several years before (Tr. 858-59, App. 1045-46); yet he and his engineering department were committed to a mouth-tube under the ear approach (Tr. 207, App. 385) until Roanwell's marketing department demanded a "me too" headset (Roanwell's Foley, Tr. 211, App. 389.)

To take away the fruits by "presuming" contrary to Roanwell's own actions, is to perpetrate a fraud on those who place any confidence in the patent system. It makes the obviousness analysis hideously complicated for courts, converting it from historical-factual to technical-speculative. It does no one good, except plagiarists.

It often occurs that the most nonobvious and difficult part of a major invention, *is the selection of the starting point*. Here, the trial court slipped into 20-20 hindsight vision and *assumed* the inventor's selection of the starting point—but the art did not teach *the men who were there* where to start or which way to go.

This court has held that to invalidate a patent for obviousness,

"The mere recital of the known elements in the prior art does not, without more, invalidate the patent under Section 103. There must appear evidence that the *bringing together* of these elements would have been obvious." *Shaw v. Whiting Co.*, 417 F.2d 1097, 1104-05 (2d Cir. 1969), emphasis the court's.

"**There must appear evidence;**" that is something more than hindsight judicial "presumption" of what might have been done but was not.

We challenge Roanwell to cite a single item of prior art in evidence, or proven action of *any pre-Hutchings worker*, which suggests that the way to build a stable, acceptable post-auricle headset is Hutchings' way.

OBVIOUSNESS IN THE REAL WORLD OF TECHNICAL INNOVATION.

Recall at the outset that witnesses for both parties, Romanow and Mol, men **"who were there"** in the real world of headset design at the time the Hutchings invention was made, concurred in a general sense in the thought that:

The principal problems in headset design are human engineering problems.

As to human engineering problems, you could never really be sure.

The reaction to comfort and to stability was very difficult to find out in the laboratory.

This inherently put the foresight workers in an entirely different posture from us who now review their work.

They worked in a context of all the mass of mankind's knowledge, speculating with their time and their financial backer's dollars as to whether this or that new combination will be advantageous, will find public favor and will render public service. The inventor's art-source is not sorted, screened or evaluated: The few kernels of wheat art are to the inventor lost in haystacks of chaff art that lead down blind alleys to frustration. — Tubes, thyratrons, amplifiers, discriminators, static, attenuation, transistors, fragility real and imagined to be real, transducers, frequency response curves, resonances, sore ears, floppy ears, stiff ears, lost communication when a boom microphone moved from the mouth, and the Superbowl score.

To the man with masses of such unsorted knowledge, no one item of knowledge seems to him to point more toward a solution than another which may in fact be an expensive blind alley to try and abandon.

By contrast, this Court's art was selected by the plagiarist in view of the public acceptance of the invention and proof of the value of the inventor's difficult selection and special combination of components.

Of the thousands of prior art references, nothing was brought to court but that which was first screened from misleading prior art, by knowledge of the invention and its value.

Thus, this court cannot get the same view of the art which those in the art at the time of the invention had — we who review their work have a record unavoidably pre-selected to bias against the merit of the inventor's effort.

The patent is not only the screen for selecting the art brought into court, it is the blueprint telling us now

- (1) that the parts *can* be assembled;
- (2) *how* to assemble them to get the advantage we are after but which will be missed if even slight error of choice or assembly is made;
- (3) the *value* of the correct assembly.

— All of which the inventor could see only mistily and others not at all.

Thus it is unavoidable that this court cannot get the same view of the art which those who were in the art had at the time the invention was made. We who review their work have a record unavoidably pre-biased against the merit of the inventor's effort.

When shown the answer, we can see clearly how to get it, while those who had not the answer could not see nearly so clearly. That is why we must, if justice is to be done, look at the historical facts of what real people really did, and render judgment on that basis.

Said this court in 1975, the historical-fact way is the only right way to determine obviousness. *Timely Products v. Stanley Aron*, 523 F.2d 288, 294, 187 U.S.P.Q. 257, 261, (2d Cir. 1975).

Said the Supreme Court, unavoidable bias toward simplistic hindsight design, is to be vigorously guarded against. *Calmar v. Cook Chemical Co.*, 383 U.S. 1, 36 (1966).

* * *

What quality of inventions do the Constitution and statute suggest should be protected?

If only inventions so dramatic as Bell's transistor and laser are protected, no R & D budget in the land can support itself. For even the Edison successful electric light and Bell's telephone and nearly all

others among the most important inventions in history, were in structural detail only very minor modifications of prior art, modifications so small as to be quite obvious by hindsight to those skilled in the prior electric light art (of which there was much), the prior telephone art, etc. See Dodds et al., "The New Doctrinal Trend," 30 *J. Pat. Off. Socy.* (1948), and Bowes, "The New Doctrinal Trend — 1975", 17 *Idea* 41 (Summer 1975), copies of which are filed in the addendum to this brief.

Against that factual background, the Congress in 1952 rejected the prior "flash of genius" test for patentability, and all the other prior tests for patentability, in favor of the most objective test it could find: Nonobviousness to the man of *ordinary skill at the time the invention was made*, 35 U.S.C. § 103. See Judge Rich, *Laying the Ghost of the "Invention" Requirement*, Address to the Los Angeles Patent Law Association, Sept. 20, 1972 (copy filed in addendum to this brief).

The point: If the invention was already in being, *or within reach of the public in that it was obvious how to get it whenever the public wanted it*, then no patent is allowed; but if the invention is so far out of reach that the public cannot have it when they want it, i.e., if it is not obvious, then the patent belongs to the men who risk their capital and sweat in that inherently high-risk investment that is R & D.

Against ~~that~~^{that} background, the law must judge patentability — solely by the test of nonobviousness *to the men who were there* in the art at the time, and not by the subjective aesthetic taste, nor by the subjective technical taste, of the judge.

* * *

Regardless of the merit of any invention, it is rare-to-never that greater or more persuasive evidence is available than on this 1969 Hutchings invention, to show the real world, industry feeling of unsatisfied need for so long after the components of the invention were available — 13 odd years after 1956, 8 years after Larkin.

What is a fruitless search? What is defiance of prior prejudices of the art? What is "acclaim"? What is it to drive a competitor from the market?

Here all those acts have been held not to have occurred with respect to Hutchings.

Yet all the "ear torture" and "headaches" brought forth the Air Force Panel of Experts, the Ohio State Research contract, the FAA studies, etc., existed as much for Hutchings to solve if he was to improve on Larkin, as for Larkin to solve before him. And after Larkin, Plantronics Audiotone, Telex, and Bell with a massive effort, tried and failed, while Roanwell with its expert staff of designers tried with its MOH (Miniature Operator's Headset) project and then copied Hutchings' success.

Let us conclude with a proper focus upon but a single factor of the many factors erroneously found not to exist by the trial court: Long-felt want or need.

What is "long"? What is "felt"? What is "want" or "need".

How *much* a need must be felt, for how "long" must a need be felt, can be discussed philosophically forever.

But surely few cases can ever bring to court evidence of as much or as long a need, more acutely felt by all in the industry, than is here shown without a shred of contradiction.

Thus the fact-finding of *no* long-felt need cries out for reversal under Rule 52(a), for it is clearly erroneous.

That done, what is left to consider?

This critical point:

It is a logical non-sequitur and an impossibility that an unfilled need can be actually felt in the subject industry for anything which it is "obvious" how to have.

It is uncontrovertible and incapable of good-faith controversion by Roanwell, that the need for a light-weight headset that afforded relief from "ear torture" and "headaches" was felt, and felt acutely, at least for 10 years after the requisite components of the Hutchings invention were available. — And the feeling was by the industry, world-wide.

Anything that was obvious to have, would have been had prior to either Larkin or Hutchings.

Any holding of obviousness in the face of the evidence here, is an inadvertent substitution of some other test for patentability than the statutory one — nonobviousness.

In this connection, it is very informative to see how the Supreme Court used the "obviousness" test in a case involving a simple aggregation of old components with no recited showing of any "synergistic" action among them:

"This argument [of mere simple assembly of old component parts] would be sound if the combination claimed by Webster was an **obvious** one for attaining the advantages proposed, one which would occur to any mechanic skilled in the art.

But it is plain, from the evidence and from the very fact that it was not sooner adopted and used, that it did not, for years, occur in this light to **even the most skillful persons**.

It may have been under their very eyes, they may almost be said to have stumbled over it; but they certainly failed to see it, to estimate its value and to bring it into notice.

Who was the first to see it, to understand its value, to give it shape and form, to bring it into notice and urge its adoption, is a question to which we shall shortly give our attention. At this point we are constrained to say that **we cannot yield our assent to the argument, that the combination of the different parts or elements for attaining the object in view was so obvious as to merit no title to invention.**

Now that it has succeeded, it may seem very plain to anyone, that he could have done it as well. This is often the case with inventions of the greatest merit." *Webster Loom Co. v. Higgins*, 105 U.S. 580, 591 (1882), emphasis added.

The court followed the same rule also in *Washburn & Moen Mfg. Co. v. Beat 'Em-All Barbed Wire Co.*, 143 U.S. 275, 282-283 (1892).

Nothing in the real-world of invention has to this day altered those principles!

To the **men who were there** in the art at the time of the Hutchings invention — who it is clear knew of all the prior art components — the Hutchings invention was not obvious.

CONCLUSION

Plantronics seeks the following relief:

That the judgment of invalidity of claim 1 of Hutchings U.S. Patent 3,548,118, be reversed; and that the judgment of invalidity of the claim of Hutchings U.S. design patent Des. 218,173, be reversed.

Respectfully submitted,

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Houston, Texas 77027
(713) 621-9100
Attorneys for Plantronics

Sept. 15, 1959

J. J. DREHER ET AL

2,904,640

COMBINATION EAR-MOUNTED MICROPHONE AND RECEIVER INSTRUMENT

Filed July 30, 1957

PLAINTIFF'S
EXHIBIT

97

Tab 1

FIG. 3

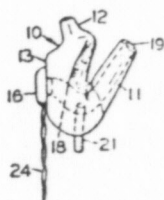


FIG. 2

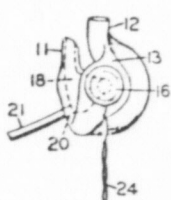


FIG. 4

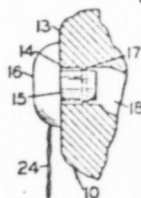


FIG. 1

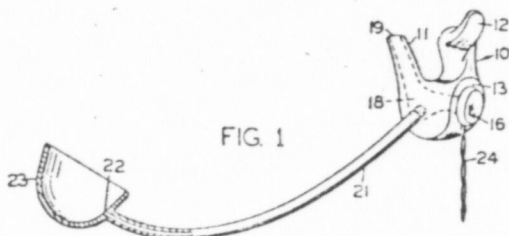
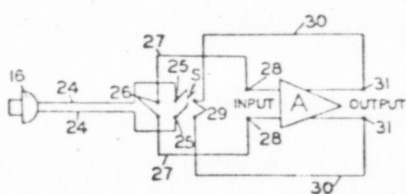


FIG. 5



FIG. 6



Dreher - Ex. 97

BY

W. J. Schwartzkopf

INVENTORS

JOHN J. DREHER

LEWIS J. SCHWARTZKOPF

ATTORNEY

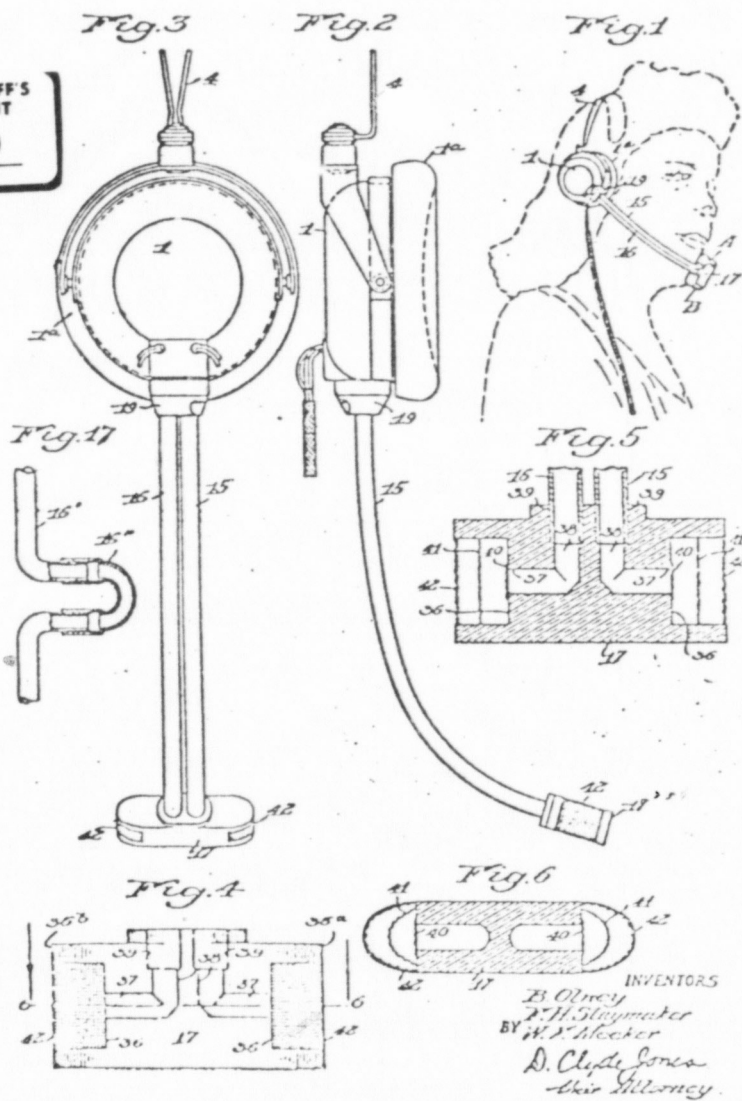
Oct. 18, 1949.

B. OLNEY ET AL
DIPOLAR MICROPHONE

2,485,405

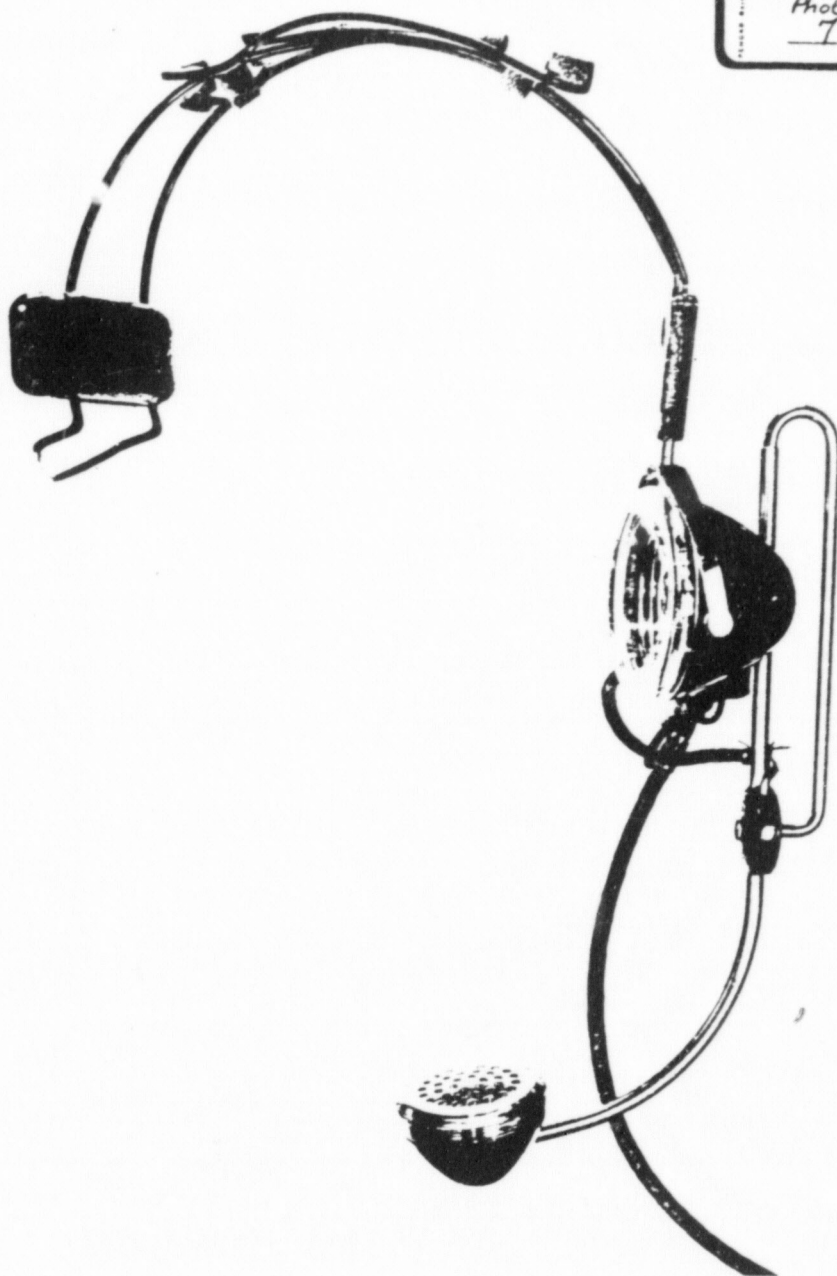
Filed April 21, 1944

6 Sheets-Sheet 1



Olney - Ex. 30

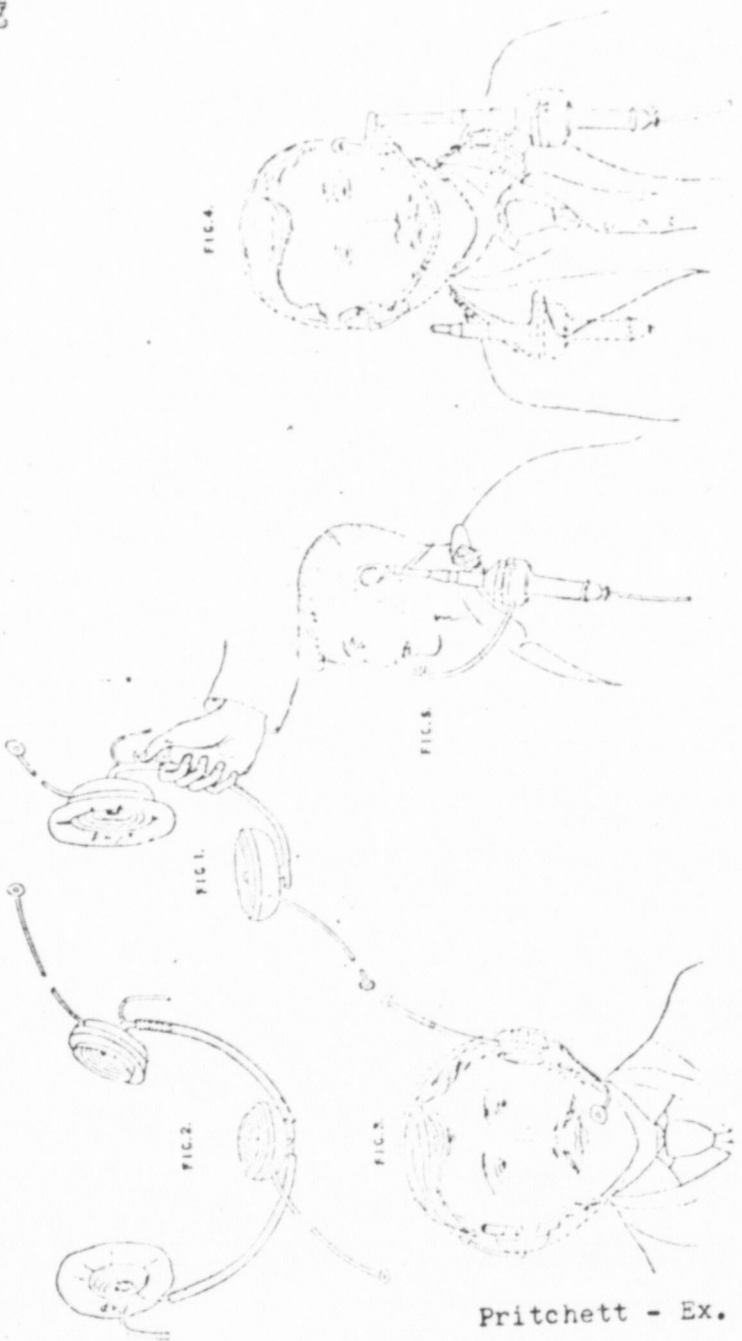
PLAINTIFF'S
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7

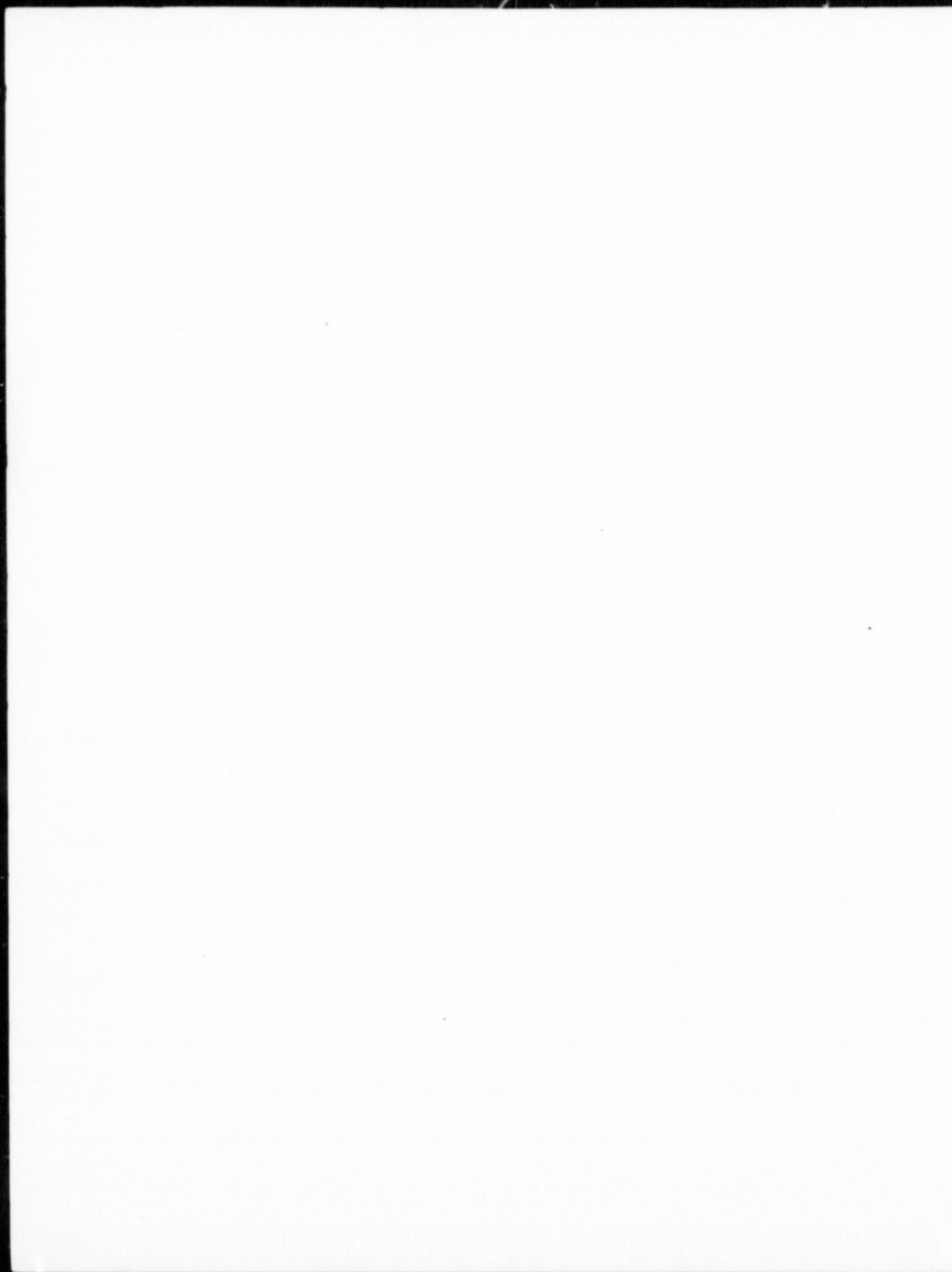


WE52 Headset - Ex. 7

17763

WILLIAM P. PRITCHETT
JAN 15 1945
U.S. PAT. OFF.





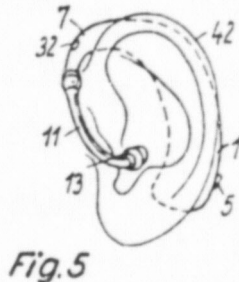
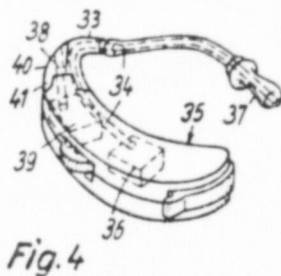
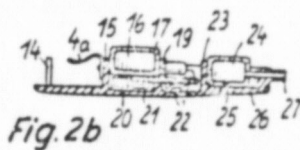
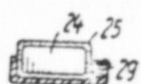
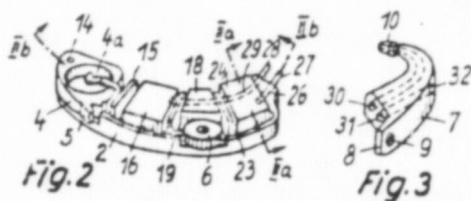
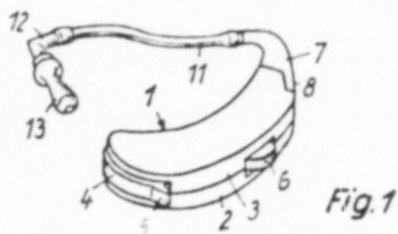
Sept. 28, 1965

W. GÜTTNER ET AL.
ELECTRICAL HEARING AID

3,209,080

Filed June 29, 1965

Tab 2



A Light-weight Headset for Telephone Operators

H. J. C. SPENCER, A.M.I.E.E., and J. S. P. ROBERTON, B.Sc.(Eng.)†

UDC 621.395.623.64:621.395.722

A new headset for telephone operators has been developed which not only has a superior performance to the head-and-breast set, but is considerably lighter and more comfortable to wear. Unlike the head-and-breast set, the new instrument does not suffer from the disadvantage that the transmitter mouthpiece cannot follow the wearer's mouth as the head turns. This improvement results from the transmitter being mounted next to the receiver in a common housing worn on the ear, a light horn being used to feed speech from the mouth to the transmitter.

INTRODUCTION

FOR very many years the head-and-breast-set type of Operators' telephone has been used in the Post Office. Instruments of this type suffer from the fundamental disadvantage that the mouthpiece of the transmitter does not follow the wearer's mouth as the head turns. As a result, unless the wearer makes a conscious effort always to speak into the mouthpiece, sending efficiency may be seriously degraded. This is illustrated by the curves of Fig. 1, which show how the output decreases as the distance of the mouthpiece from the user's mouth increases. In addition, head-and-

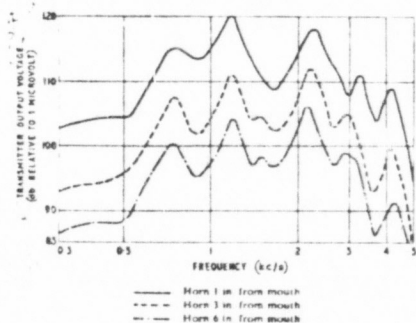


FIG. 1—BREAST-SET TRANSMITTER—VARIATION OF OUTPUT WITH DISTANCE FROM MOUTH

breast sets are unpopular with operators because they are cumbersome to wear. The particular set used by the Post Office has the further disadvantages of being rather heavy and of having a poor transmission performance compared with that of the new type of table telephone. This poor transmission performance is no disadvantage for public exchange use, because of the operator's favourable position in the line network, but it would present problems if the headset were used at private branch exchanges (P.B.X.s) working on the recently extended transmission limits for local line networks. Because of these disadvantages the Post Office has now developed, in co-operation with the telephone manufac-

turers, a light-weight one-piece headset to supersede the head-and-breast set, and the process of completely replacing the old instruments by the new has commenced. The new instrument is illustrated in Fig. 2.

THE NEW HEADSET

As a preliminary to work on a new design, user trials were made of a one-piece instrument for which the now conventional practice was followed of putting the transmitter at the end of a boom projecting from the receiver (a practice pioneered in this country in 1933 by Standard Telephones and Cables, Ltd.). The trials showed that the concentration of transmitter weight at the end of the boom resulted in an unstable arrangement, and for the new headset an alternative solution has been adopted; namely, to mount the transmitter next to the receiver in a common moulded housing worn on the ear. Speech is fed to the transmitter from the mouth by a light horn. The advantages of this novel form of construction compared with the use of a transmitter supported on a boom are:

- A better balance is achieved, giving increased stability with lower headband pressure.
- Operators naturally like the obstacle in front of

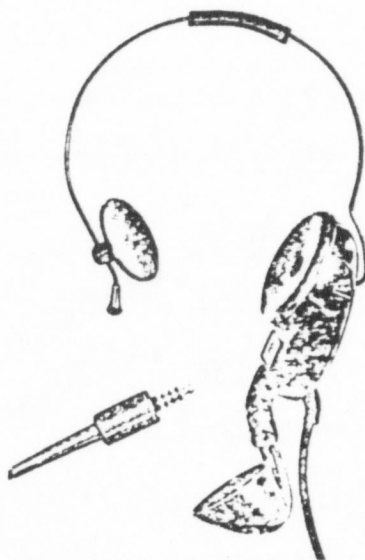


FIG. 2—THE NEW HEADSET

††† Spencer is in the Subscribers' Apparatus and Miscellaneous Services Branch, P.O.'s Office, and Mr. Robertson is with Standard Telephones & Cables, Ltd.

June 7, 1960

J. D. HENDERSON

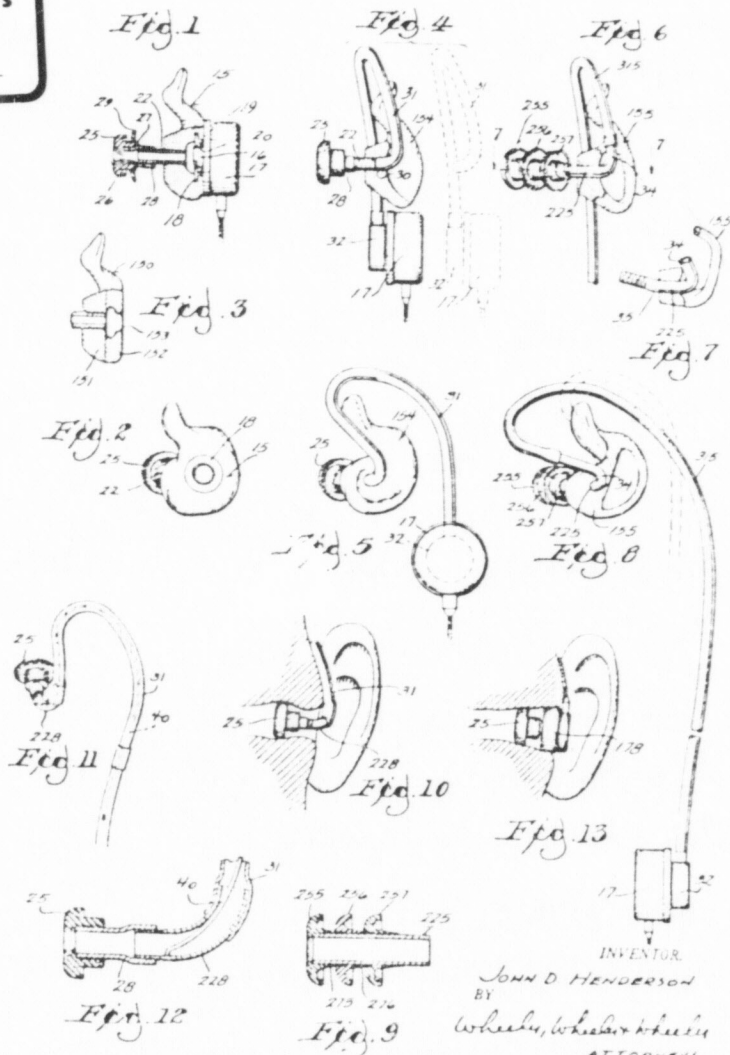
2,939,923

HEARING AID PLASTIC EAR PIECES

Filed Aug. 3, 1955

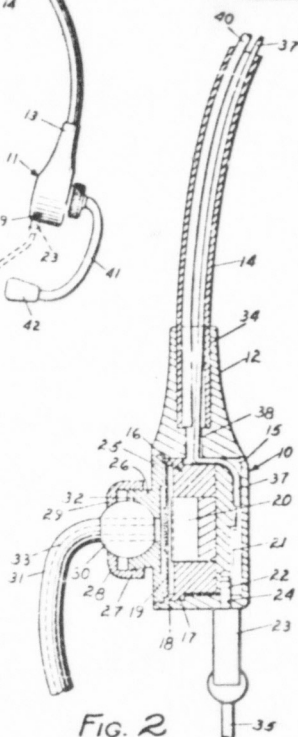
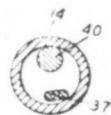
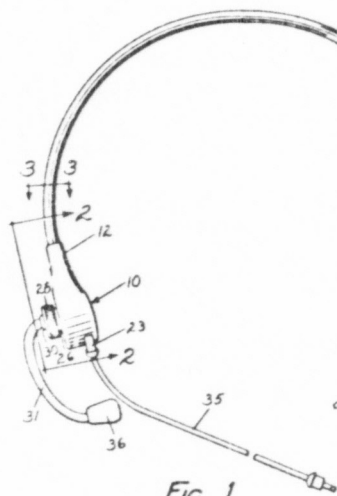
PLAINTIFF'S
EXHIBIT

44



2,586,644

2 SHEETS—SHEET 1



INVENTOR
RUSSELL C. GILBERT
BY *Paul, Paul & Moore*
ATTORNEYS

35

36



Adjustable tone arms transmit sound directly to ears via heavy, sweaty cans. Mike is mounted in shock absorbing frame at end of fully adjustable boom—angled for best pickup. Choice of general purpose 50 ohm carbon mike (output 30 db above 1MV) or 250 ohm noise canceling differential magnetic mike (output—85 db below 1 Volt/Microbar).

BE SURE TO ORDER BY CATALOG NUMBER

Stock Number	Model Name	Catalog Number	Model Name	Catalog Number
18760	Headset w/ double earpiece & 5' cord w/ terminal phone plug	RMV 12	Headset w/ 50 ohm carbon mike	RMV 11
18761	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 13	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 14
18762	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 15	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 16
18763	TV type headset w/ double earpiece, split phone & cord as above	RMV 17	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 18
18764	Headset w/ double earpiece, split phone & cord as above	RMV 19	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 20
18765	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 21	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 22
18766	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 23	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 24
18767	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 25	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 26
18768	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 27	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 28
18769	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 29	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 30
18770	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 31	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 32
18771	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 33	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 34
18772	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 35	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 36
18773	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 37	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 38
18774	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 39	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 40
18775	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 41	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 42
18776	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 43	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 44
18777	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 45	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 46
18778	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 47	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 48
18779	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 49	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 50
18780	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 51	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 52
18781	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 53	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 54
18782	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 55	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 56
18783	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 57	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 58
18784	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 59	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 60
18785	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 61	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 62
18786	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 63	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 64
18787	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 65	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 66
18788	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 67	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 68
18789	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 69	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 70
18790	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 71	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 72
18791	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 73	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 74
18792	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 75	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 76
18793	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 77	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 78
18794	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 79	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 80
18795	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 81	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 82
18796	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 83	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 84
18797	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 85	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 86
18798	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 87	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 88
18799	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 89	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 90
18800	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 91	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 92
18801	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 93	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 94
18802	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 95	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 96
18803	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 97	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 98
18804	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug	RMV 99	Headset w/ 250 ohm noise canceling differential magnetic mike	RMV 100



Here's the ORIGINAL under-chin, headset. Ideal for listening systems, business and record listening, broadcasting, and for application. Weighing only 1.2 oz., it is 5' cord and standard phone plug. Sensitivity 100 db above 1MV. 100 to 6500 cycles.

Catalog Number	Model Name
RMV 2	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug
RMV 7	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug
RMV 12	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug
RMV 17	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug
RMV 22	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug
RMV 27	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug
RMV 32	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug
RMV 37	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug
RMV 42	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug
RMV 47	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug
RMV 52	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug
RMV 57	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug
RMV 62	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug
RMV 67	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug
RMV 72	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug
RMV 77	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug
RMV 82	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug
RMV 87	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug
RMV 92	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug
RMV 97	Headset w/ 50 ohm carbon mike & 5' cord w/ terminal phone plug



TWINSET* Perfect for amateur, commercial, and industrial communications, the Twinset is CAA approved and is standard equipment on airlines and private planes. Comfort replaces listening fatigue. Adjustable tone arms pipe sound into ears, blocking out background noise, yet ear tips need not even touch user's ears. Weighs 1.6 oz. and has 5' cord and standard phone plug. Special cord with built-in miniature volume control also available.

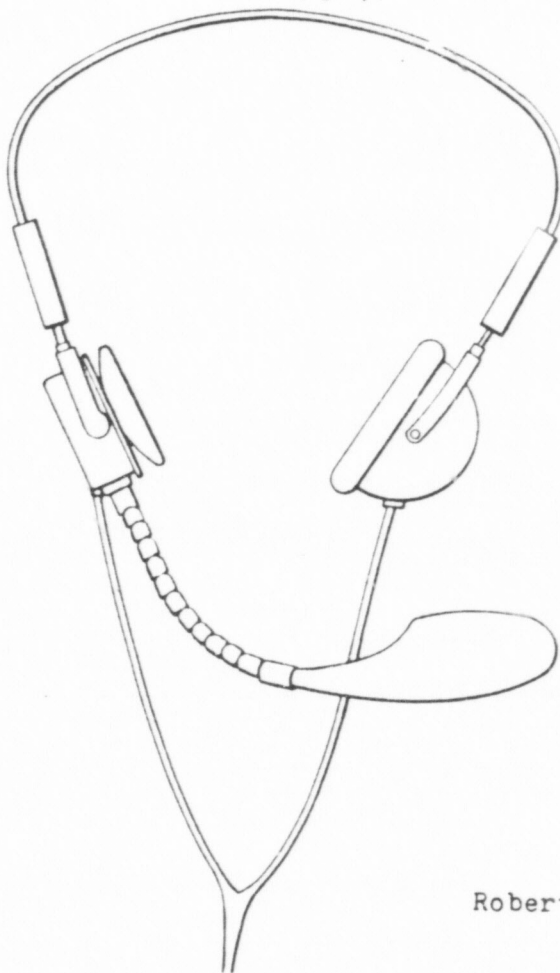
Sensitivity is 101 db above .0002 dynes per sq. cm. for 10 micro-watts input.

Stock Number	Catalog Number
13781—TWINSET, 64 ohm imp. complete, std. cord	RMV 1
13782—TWINSET, 100 ohm imp. complete (CAA app), std. cord	RMV 2
13783—TWINSET, 64 ohm imp. complete, 10' cord	RMV 3
13784—TWINSET, 100 ohm imp. complete, 10' cord	RMV 4
13785—TWINSET, 64 ohm imp. 10' cord	RMV 5
13786—TWINSET, 100 ohm imp. 10' cord	RMV 6
13787—TWINSET, 64 ohm imp. 10' cord	RMV 7
13788—TWINSET, 100 ohm imp. 10' cord	RMV 8
13789—TWINSET, 64 ohm imp. 10' cord	RMV 9
13790—TWINSET, 100 ohm imp. 10' cord	RMV 10
13791—TWINSET, 64 ohm imp. 10' cord	RMV 11
13792—TWINSET, 100 ohm imp. 10' cord	RMV 12
13793—TWINSET, 64 ohm imp. 10' cord	RMV 13
13794—TWINSET, 100 ohm imp. 10' cord	RMV 14
13795—TWINSET, 64 ohm imp. 10' cord	RMV 15
13796—TWINSET, 100 ohm imp. 10' cord	RMV 16
13797—TWINSET, 64 ohm imp. 10' cord	RMV 17
13798—TWINSET, 100 ohm imp. 10' cord	RMV 18
13799—TWINSET, 64 ohm imp. 10' cord	RMV 19
13800—TWINSET, 100 ohm imp. 10' cord	RMV 20

716801 PROVISIONAL SPECIFICATION
2 SHEETS This drawing is a reproduction of
the Original on a reduced scale.
SHEETS 1 & 2

Tab 3

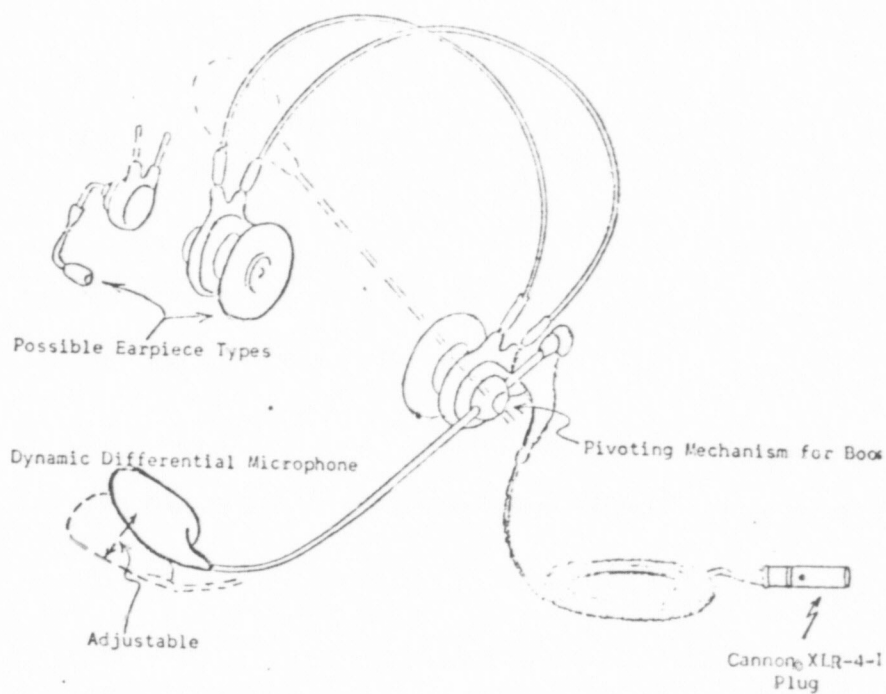
FIG. 4.



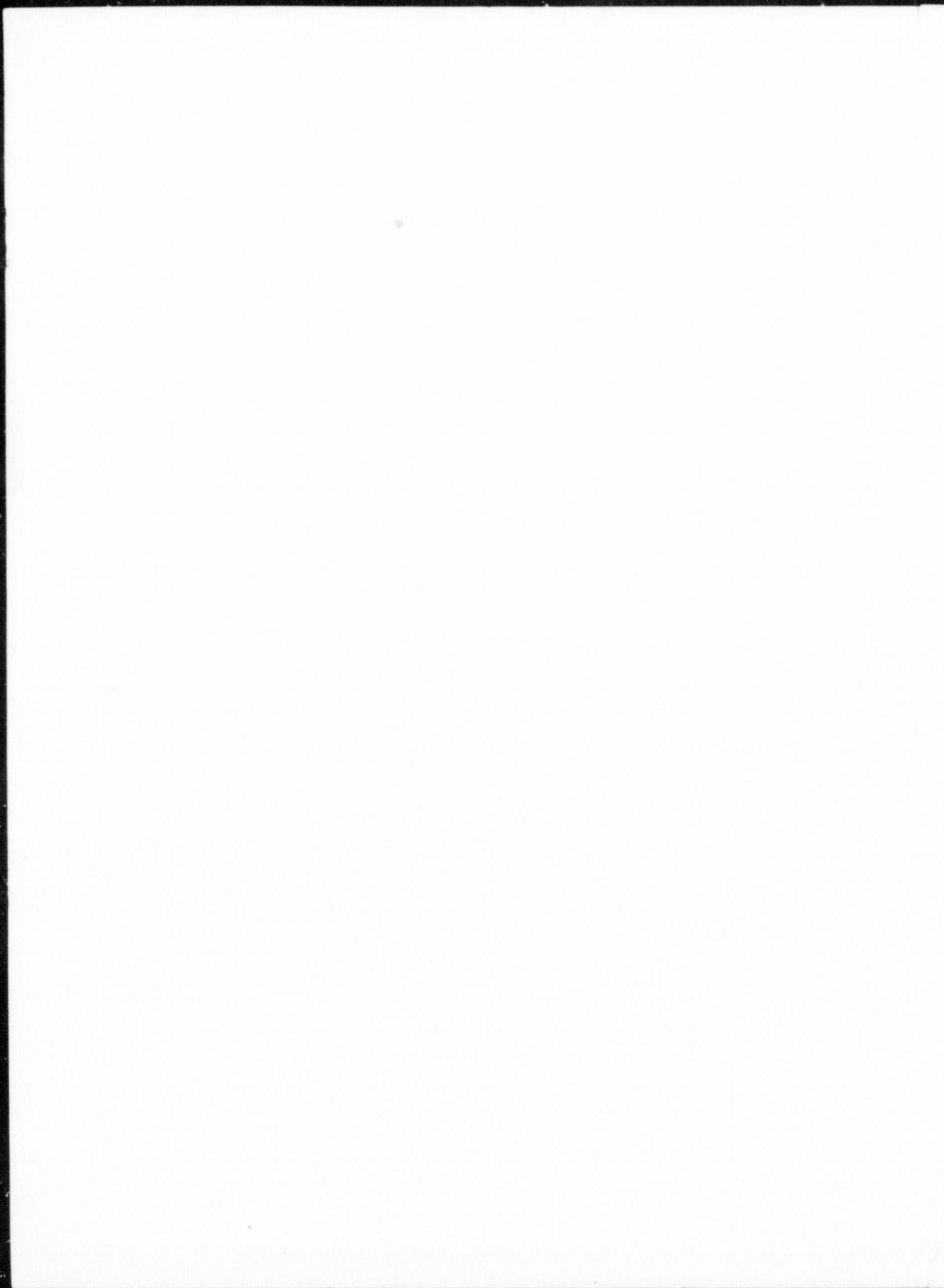
Robertson - Ex. C

March 25, 1957

ATTACHMENT 1



One Possible Arrangement for
Light-Weight Headset and Boom
Microphone



PLAINTIFF'S
EXHIBIT
Photo of
12



Carter Headset - Ex. 12

PLAINTIFF'S
EXHIBIT
Photo of
10



Airmed Headset - Ex. 10

PLAINTIFF'S
EXHIBIT

11

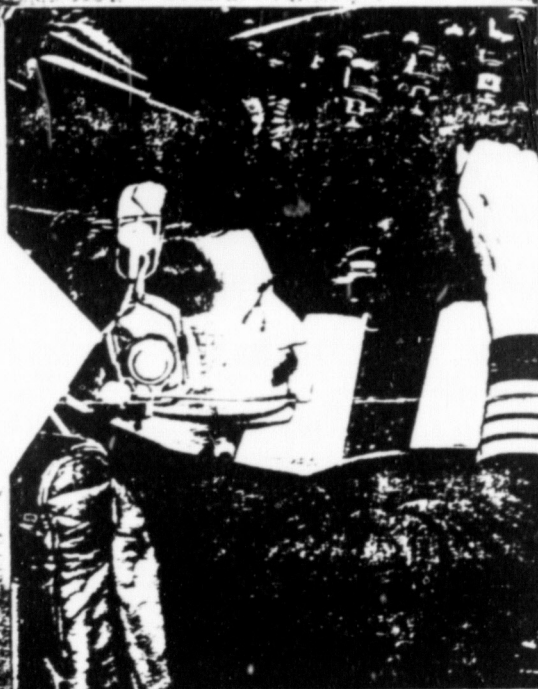
AMPLILITE AIRCREW HEADSETS SERIES A

AMPLILITE

Amplilite Headphones and Headsets, attractively finished in pale grey, combine lightweight wearing comfort with a robust construction. Designed for arduous service, all forms of the Headset meet the climatic and durability requirements of the Ministry of Aviation and Federal Aviation Agency.

Amplilite provides a standard of sound-proofing only previously obtainable with Headset 13600 developed for R.A.F. Transport Command. Light alloy ear shells filled with sound-absorbing foam plastic and fitted with replaceable fluid-filled ear cushions protect the wearer from severe noise levels. Where high noise attenuation is unnecessary, alternative soft rubber ear pads can be attached to the polythene-coated ear shells.

Any one of three microphones—standard magnetic, noise-cancelling magnetic or noise-cancelling carbon—may be attached to an all-position boom arm. A novel locking trigger on the boom permits full personal adjustment whilst allowing instant parking above the head when the microphone is not required.



Amplilite in a Bristol Britannia by courtesy of Conard Eagle Airways

Amplivox Industrial



EP 006077

ARNOLD, WHITE & DURKEE

A PROFESSIONAL CORPORATION

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EDWARD W. GOLDSTEIN
ALAN H. GORDON
FLOYD R. NATION
BRUCE NEWELL
BEN D. TOBOR
CARL SWARTZ

January 29, 1976

TELEPHONE
AREA CODE 713
621-9100
CABLE: LEXTEX
TELEX: 76-2660

FILE: G181

Mr. A. Daniel Fusaro, Clerk
U.S. Court of Appeals
United States Courthouse
Foley Square
New York, New York 10020

Re: Plantronics Inc. v. Roanwell Corp.
Docket Nos. 75-7621 and 75-7645

Dear Sir:

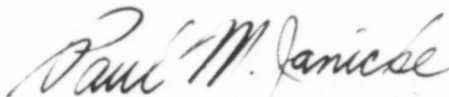
Enclosed for filing are twenty-five copies of the Brief of Appellant Plantronics in the above cases, ten copies of the Joint Appendix (two volumes), and four copies of the Exhibit Volumes (three volumes).

This is a patent case, and pursuant to Rule 32(a), F.R.A.P., the larger brief and exhibit volume sizes are employed.

The court on December 10, 1975, granted permission to file main briefs exceeding the page limits of F.R.A.P. Rule 28(g), up to 80 pages of standard typographic printing.

The requisite number of copies of the brief, appendix, and exhibit volumes have been delivered to counsel for Roanwell, as evidenced by the attached receipt.

Very truly yours,



Paul M. Janicke
Attorney for Plantronics

PMJ:cj
Enclosures

Receipt

Two copies of the Brief of Appellant Plantronics, Inc.,
one copy of the Joint Appendix (2 vols.) and one copy of the
Exhibit Volumes (3 vols.) were received this 30th day of
January, 1976.

COOPER, DUNHAM, CLARK, GRIFFIN
& MORAN

by:

Elizabeth C. Moran